BULLETIN
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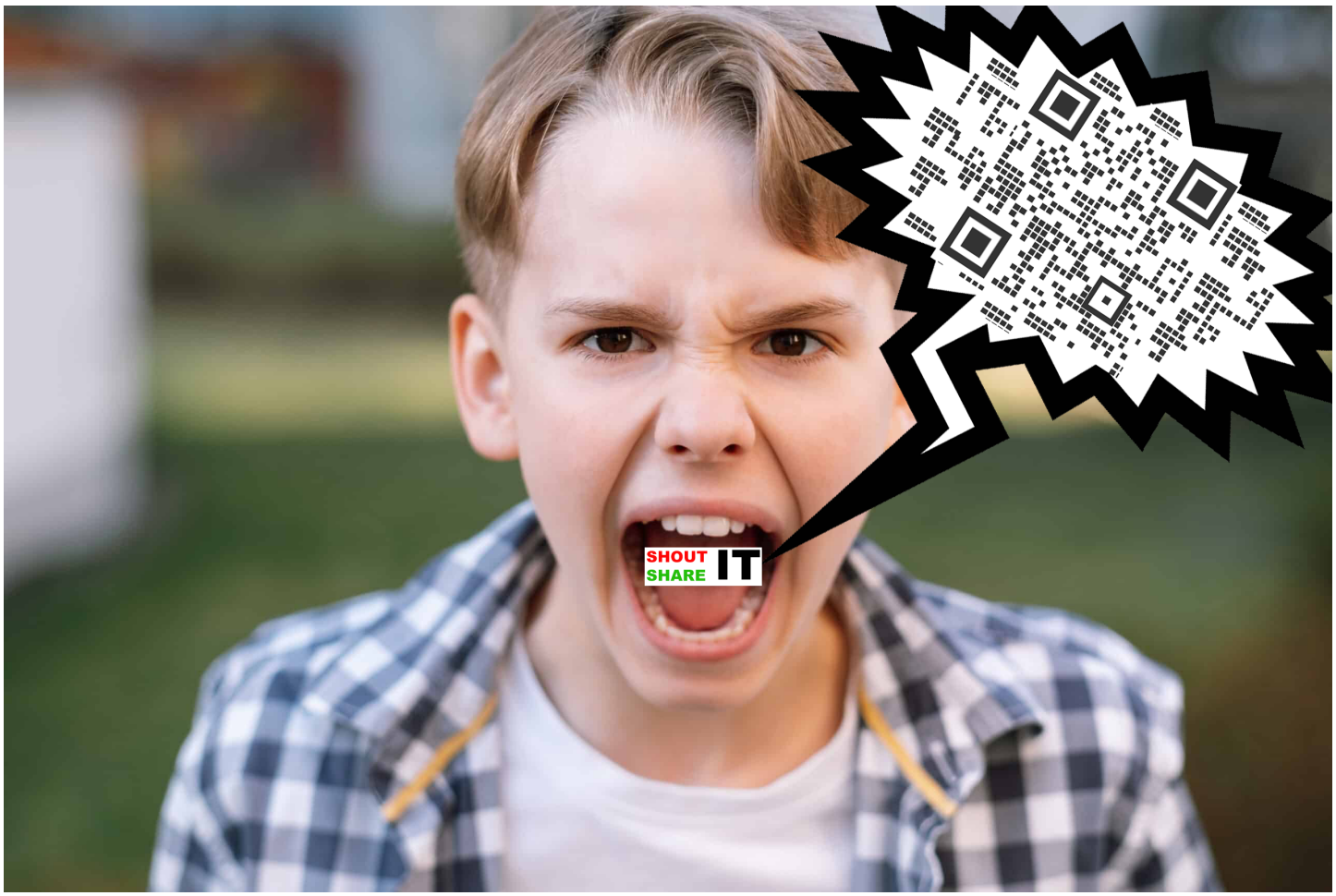
Chicago Natural History Museum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Members are requested to inform the Museum promptly of changes of address.

SIXTEEN EXPEDITIONS PLANNED FOR 1951

Sixteen expeditions are scheduled to go into the field for the Museum in 1951, it is announced by Colonel Clifford C. Gregg, Director.

The largest-scale operation will be the 17th Southwest Archaeological Expedition, which will continue the work of past expeditions in the New Mexico prehistoric culture field. Dr. Paul S. Martin, Chief Curator of Anthropology, again will be the leader, and his chief assistant will be Dr. John B. Rinaldo, Assistant in Archaeology. It is planned in the new season to continue the research so successfully begun in 1950 in dry caves where an abundance of material of a perishable type was obtained. New caves will be opened in 1951 with the objective of finding artifacts of additional kinds to fill in sequences incomplete because of gaps in the Tularosa Cave stratigraphy of the 1950 operation.

The Department of Botany will attach an expedition of its own to the Southwest Archaeological Expedition. Dr. Hugh C. Cutler, Curator of Economic Botany, will conduct this expedition, which has for its purpose comparison of the types of vegetable food products found in Tularosa Cave with the crops that grow in this area today.

SAN SALVADOR PROJECT

Several members of the Museum staff—Dr. Sharat K. Roy, Chief Curator of Geology, Dr. Austin L. Rand, Curator of Birds, Robert K. Wyant, Curator of Economic Geology, Dr. Fritz Haas, Curator of Lower Invertebrates, and a member of the botanical staff—are slated to go to San Salvador for collecting and research in their respective fields. This work got under way in 1950 when the Museum dispatched Dr. Norman C. Fassett, Professor of Botany and Curator of the Herbarium of the University of Wisconsin, to this field in September for the collecting of aquatic plants. He will remain until about June.

Emil Sella, Curator of Exhibits in the Department of Botany, and Samuel H. Grove, Jr., Assistant in Plant Reproduction, will leave for various parts of Florida in January to collect exhibition material.

Bryan Patterson, Curator of Fossil Mammals, and Orville L. Gilpin, Chief Preparator of Fossils, will continue collecting from early Cretaceous mammal bearing deposits in Texas, a project in which they have been engaged for several seasons.

FOSSIL-FISH COLLECTING

Dr. Robert H. Denison, Curator of Fossil Fishes, will collect material in his field from middle Devonian limestone deposits in central and northern Ohio. During July or August Curator Denison will collect from Devonian limestone and shales in western New York and Silurian fish fossil localities in New York and Pennsylvania.

George Langford, Curator of Fossil Plants, will make a series of field trips to obtain material of the Coal Age in the area near Wilmington, Illinois, and will collect upper Cretaceous and Eocene fossil plants in Tennessee and Mississippi.

Philip Hershkovitz, Assistant Curator of Mammals, will continue the Colombian Zoological Expedition upon which he has been engaged since 1948.

Eugene S. Richardson, Jr., Curator of Fossil Invertebrates, will collect invertebrates of the lower Paleozoic period in various parts of the West.

SEEKS AFRICAN BIRDS

Harry A. Beatty, of New York City, ornithologist who collected for the Museum in Liberia during 1946–47, will collect birds and other animals in selected areas in French Equatorial Africa.

Karl P. Schmidt, Chief Curator of Zoology, Clifford H. Pope, Curator of Amphibians and Reptiles, and Colin C. Sanborn, Curator of Mammals, will continue various branches of field work within the United States. Chief Curator Schmidt will resume field trips for reptiles and amphibians in Texas in the spring. Each year he covers a selected area. Curator Pope will continue his investigation of salamanders in Arkansas. Curator Sanborn will continue his survey of mammals of Arkansas in co-operation with colleagues at the University of Arkansas.

Loren P. Woods, Curator of Fishes, has been invited by the U. S. Fish and Wildlife Service to participate in deep-water investigations to be conducted in the Gulf of Mexico during a cruise of the government ship *Oregon*. Curator Woods and Robert F. Inger, Assistant Curator of Fishes, will continue their successful cave-fish studies in underground caverns of Missouri and Arkansas. In 1950 they worked in similar caves in Tennessee, Indiana, and Illinois.

ALBERT B. WOLCOTT, 1879–1950

Albert B. Wolcott, a Museum employee for thirty-four years, died on December 8, in the DuPage County Convalescent Home, at the age of 81. Mr. Wolcott was born in Bloomington, Illinois, on January 9, 1879. While still a youth he became interested in insects, especially beetles, on one family of which he soon specialized. He became a noted authority and the author of nearly forty papers on the small bright-colored checkered beetles, the Cleridae, some of which are commonly seen on flowers.

A. B. WOLCOTT

In July, 1908, Mr. Wolcott was appointed as an assistant in the Division of Insects in the Museum, and in January, 1914, he was transferred to the then newly formed N. W. Harris Public School Extension of the Museum. In this department his artistic skill and knowledge of insects were very useful in preparing exhibits of insects and other material in the small portable cases that are circulated in the Chicago schools.

In 1942, his failing health and diminishing eyesight compelled him to end his Museum duties, as well as the research work he did for many years on his chosen family of beetles, to which he devoted all of his spare time. His extensive and valuable collection of beetles of the family Cleridae and his books and papers pertaining to them he generously donated to the Museum when he retired. The Museum published his *Catalogue of North American Beetles of the Family Cleridae* in 1947.

WILLIAM J. GERHARD
Curator Emeritus of Insects

Last Call for Entries of Nature Photos

January 15 is the deadline for entries in the Sixth Chicago International Exhibition of Nature Photography to be held at the Museum February 1 to 28, inclusive, under the auspices of the Nature Camera Club of Chicago and the Museum.

Silver medals and ribbons will be awarded in the various print and slide classifications.

MARIANAS EXPEDITION EXCAVATES ANCIENT 'GHOST HOMES'

By ALEXANDER SPOEHR
CURATOR OF OCEANIC ETHNOLOGY

Its field work completed, the Museum's 1949–50 Anthropological Expedition to the Marianas Islands has returned to Chicago, where the bone and stone tools, pottery, ornaments, and all the other objects and artifacts excavated from the shores of those far-off Pacific islands await the patient study necessary to unravel the secrets of a past lived hundreds of years ago by men long since dead and forgotten. The Museum for many years has maintained an interest in the peoples and cultures of the Far East and the Pacific. A major objective of the Marianas expedition was to push forward the understanding of man's early history in that section of the Pacific called Micronesia, in which the Marianas lie. Most of Micronesia is administered today by the United States, as a United Nations trust territory, the islands having been captured from Japan in World War II.

'THE HOUSE OF TAGA'

Massive stone columns on the island of Tinian. Part of the capstone on top of the column in the background has broken off. The one in the foreground has broken off, too, probably under the weight of its capstone. Column with capstone is more than 16 feet high.

A previous BULLETIN article described some of the earlier excavations conducted in 1950 by the Museum on Saipan, where the headquarters of the expedition were maintained. Although the final results of the work will not be known until the field collections have been studied thoroughly, in this article the remaining excavations of the Museum expedition will be briefly described.

GHOSTS AND STONE COLUMNS

The characteristic feature of most of the surviving prehistoric sites in the Marianas are groups of stone columns or pillars. Locally, these are called *latte*. Many of the Chamorros—the native people of the Marianas—believe that these *latte* mark ancient graveyards that still remain the homes of ghosts of the dead of olden times. These ghosts wander among the living today and can be seen as vague shapes and apparitions, particularly at night or just at dusk. They have the power to harm the living by causing illness, and so are feared and avoided. It took a great deal of diplomacy and tact to convince the native digging crew that if excavations at *latte* sites were carried on in a properly respectful manner the ghosts of the ancient dead would not harm those that had come to pry into the secrets of the past.

The *latte* sites are indeed burial places. They are for the simple reason that the stone pillars, or *latte*, were the foundation posts for houses, and the ancient dwellers of these houses had the custom of burying their dead under the house, or immediately to the seaward side of the house. The stone pillars are not gravemarkers, but merely the most solid type of house post available to the original builders.

LATTE SITES OF TINIAN

The previous BULLETIN article described the excavation of two *latte* sites on Saipan. Following the completion of the Saipan excavations, the expedition shifted its activities to the nearby island of Tinian—known to the modern world as the base from which the first atom bomb of World War II was flown to Japan to be dropped on hapless Hiroshima. On Tinian two major *latte* sites were dug. One of the expedition's objectives was to find a *latte* village site as undisturbed as possible—the Saipan sites had been considerably disturbed—and we were fortunate in locating a relatively intact village, which we called the Blue Site, as it lay directly back of a beach designated by invading American marines during the war as Blue Beach. A second objective of the expedition on Tinian was to investigate the largest *latte* house in the Marianas, known as the House of Taga. Taga is an old Chamorro culture hero, a man believed to have been of great size, who built his house of giant stone pillars on the shore at Tinian's harbor.

THE BLUE SITE

The Blue Site consisted of a dozen large, stone-pillared houses strung end-to-end back of, and paralleling, the beach. At one time there may well have been additional houses, whose pillars have since disintegrated. At the center of this string of houses was the largest structure, with pillars over 9 feet high and with an over-all length of 60 feet. Probably this center house belonged to the local chief, or served a communal purpose. Back of the houses, the earth was found to contain areas densely filled with charcoal and broken utilitarian pottery, indicating that this was the area where the cooking was done. To the seaward side, a number of small refuse mounds were found, where unwanted trash was dumped. As in the case at Saipan, burials were found under the houses and toward the seaward side. And fortunately, as was also the case on Saipan, the fears of the digging crew were allayed by the careful and respectful manner in which the burials were unearthed. The men were further satisfied that the ghosts of these ancient dead would be honored to have their bones repose in the modern steel storage cases at the Museum, in company

(*Continued on page 4, column 3*)

SOUTH PACIFIC 'DIG'

Chamorro workmen commencing excavations on an ancient "latte" or stone-pillared house at the Blue Site, Tinian, for the Museum's Archaeological Expedition to the South Pacific.

THIS MONTH'S COVER

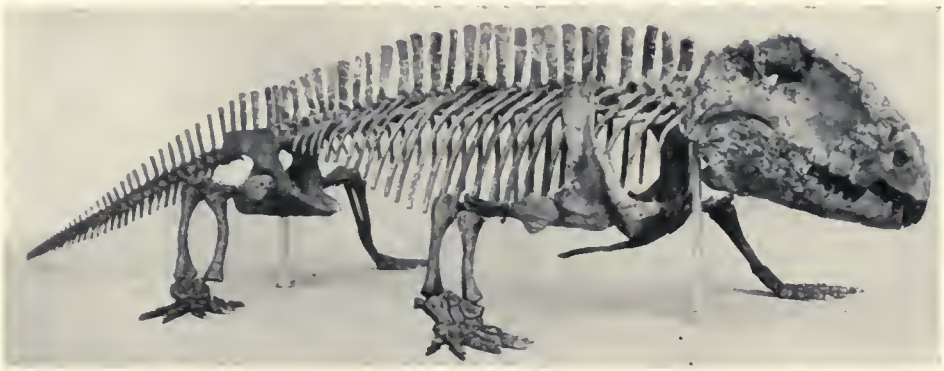
The king of Arctic beasts is shown in our cover illustration. The polar bear, *Thalarctos maritimus*, is truly a "maritime sea-bear." It is a veritable symbol of the polar region. It is the only member of the bear group that swims boldly at sea, seeking its food on ice floes. Its long, yellowish-white fur blends in with its normal background of ice and snow, over which it hunts for seals. The polar bear adjusts itself so well to life in warmer climates that it is a familiar sight in zoos and is known to every school child in our larger cities. The cover picture shows part of a habitat group in Hall 16.

NEW FOSSIL REPTILE AND AMPHIBIAN EXHIBITS

By RAINER ZANGERL
CURATOR OF FOSSIL REPTILES

The Division of Vertebrate Paleontology has completed the first three exhibits in a program of remounting the superb skeletons of early reptiles and amphibians received from the University of Chicago as a gift. These exhibits may now be seen in Ernest R. Graham Hall (Hall 38).

The amphibian and early reptile exhibits were designed to answer a number of questions pertinent to the current views about the origin of these animals, as well as to show them as free-mounted skeletons. There is little doubt in the minds of most paleontologists that the amphibians evolved from fishes, and among the latter from a group known as lobe-fin fishes, or crossopterygians.



NEW ADDITION TO FOSSIL REPTILE EXHIBITS

Skeleton of Bradysaurus baini, a sizable pareiasaur reptile from the Karroo of South Africa. The specimen is displayed in Ernest R. Graham Hall (Paleontology—Hall 38).

We do not yet know a specific animal that is clearly intermediate in its bodily structure between the fishes and the amphibians. We are thus left to wonder how, for instance, the paired fins of the ancestral fish became walking limbs in the amphibian. The process must have involved not merely the appendages but also a large portion of the body. The fins of a fish suspended in water are not used, ordinarily, to support the weight of the body. They are attached to small girdle bones and muscle groups at the lower sides of the fish. The limbs of an animal walking on land, however, must support the entire weight of the animal. Thus the major difference does not lie in the actual shapes of the fins and the limbs but in their connections with the principal supporting structures of the body as a whole.

WIDE VARIATIONS

In speaking of early amphibians we are inclined to think of them only as a group of animals that arose from the fishes and in turn led to the origin of the reptiles. We should not forget, however, that the amphibians underwent adaptive radiation on their own. Many of them became specialized swimming predators, bottom-dwelling scavengers, mud-burrowers, and some were land-dwellers much as the early reptiles were.

It can be stated, as has been done in these exhibits, that the amphibians pioneered and the reptiles completed the conquest of the land. The most important step in this process was probably the evolution of a "land egg," an egg that is so constructed that it will not dry out readily, even though its shell must be porous, and will provide the developing embryo with enough food substances to complete its early stages of organ formation and growth inside the protected enclosure of the egg shell.

All this, however, is not enough. The early development of the embryo itself had to be modified in accordance with the changed circumstances of development. The embryo had to be enclosed in a separate fluid-filled container, and a sack to receive the waste products had to be provided. Numerous embryonic blood vessels cover the latter and the food-containing yolk sac, and serve to carry oxygen to and carbon dioxide away from the embryo. Needless to say, the conquest of the land by the reptiles involved far more changes than one would be led to believe by comparing the rather similar construction of the skeletons of early amphibians and reptiles.

MANY RETURN TO WATER

Having once conquered the land, a great many reptiles returned to the water. Some of them became swamp dwellers, others went to sea. Among the latter are the well-known ichthyosaurs (fish-lizards) whose external appearance is that of a fast-swimming shark, the plesiosaurs whose body has been described as resembling a snake pulled through a turtle, and many other kinds that lived entirely in an aquatic environment.

The third exhibit houses the unbelievably bulky skeleton of the pareiasaur, *Bradysaurus*, a native of South Africa. The bones of this barrel-bellied vegetarian are so large with respect to the over-all size of the skeleton that few students can agree as to the probable posture the animal assumed when alive. It is reasonably safe to say, however, that *Bradysaurus* was a sluggish animal and spent most of its days in shallow lakes and swamps. There, the unquestionably great weight of its body would have been largely supported by the water.

MARIANA 'GHOST HOMES'—

(*Continued from page 3*)

with distinguished skeletal friends from many other parts of the world.

THE HOUSE OF TAGA

The second *latte* site at Tinian—the House of Taga—is truly impressive, despite the fact that all the stone pillars except one have collapsed. Originally, there were twelve massive stone pillars, each surmounted by a capstone, the pillar and capstone rising to a height of 16 to 17 feet. Each pillar and capstone together weighed approximately 15 tons. The quarry from which these stones came is located about a mile south of the site. Although it is probable that the pillars at the House of Taga were erected through the use of an earth ramp, how they were transported from the quarry by a people who—so far as we can tell—had no knowledge of the wheel remains a mystery, if one does not accept the ancient Chamorro legend that for a being with the great strength of the giant Taga, the construction of such a house was no great feat.

The House of Taga represents a final flowering of the prehistoric Chamorro preoccupation with bigger and better house columns. At the House of Taga, the expedition sunk a series of test trenches into the subsoil, not so much to find artifacts contemporary with the Taga *latte* as to find out what lay beneath them. At the Blue Site the soil was so shallow that a previous occupation was precluded. The House of Taga, however, was literally built on sand—an old dune at least 20 feet in depth. In the test trenches, pottery was found underlying the Taga *latte* to a depth of some six feet, indicating that the site had been occupied by a people earlier than the builders of Taga's House.

LATTE CULTURE AND ANTECEDENTS

The many *latte* sites of the Marianas are sufficiently alike and the material recovered from them sufficiently similar so that we can allocate them all to a *latte culture*. This culture reached its climax with the House of Taga. In addition to *latte*-building, the culture is characterized by a distinctive set of pottery types, by a mixed fishing-agriculture economy, and by a characteristic set of shell, bone, and stone tools. From documentary and archaeological sources we know that the *latte culture* endured until the Spanish conquest of the Marianas in the 16th and 17th centuries, but how far back

in time the culture goes is still a matter of conjecture. However, on several sites on Saipan and Tinian, the Museum's excavations found evidence of a more ancient non-*latte*-building occupation. How old this earlier occupation is cannot yet be determined with any degree of exactness, but the geological evidence indicates a probable antiquity of some 750 to 1,000 years. Though man may have been in the Marianas at an even earlier time, at present our still tentative time scale cannot penetrate further back than this approximate date.

The story of those early wanderers who first voyaged into the expanses of the Pacific's blue waters is still largely unknown, but the Museum expedition was successful in pushing the anthropologist a step ahead in his task of reconstructing, on the sound basis of knowledge that only archaeology can provide, the culture history of the vast Oceanic area.

MUSEUM STAFF CHANGES

Two of the Museum's Curators were retired from active duty as of December 31, 1950. They are William J. Gerhard, Curator of Insects, and Paul C. Standley, Curator of the Herbarium. As both are desirous of continuing scientific research, they will retain connection with the Museum, each having been appointed Curator Emeritus in his division.

Mr. Gerhard is a veteran of nearly fifty years' service on the Museum staff—the longest service record of any staff member now living. He joined the staff in 1901 as Assistant Curator of Insects, became Associate Curator of Insects in 1921, and Curator of Insects in 1936. Born in 1873 near Reading, Pennsylvania, Mr. Gerhard was educated in the schools of that area and at Temple College in Philadelphia. He was Jessup Student on Insects at the Academy of Natural Sciences in Philadelphia from 1895 to 1898. Before coming to the Museum he collected butterflies in Bolivia. In the course of his duties here he engaged in local entomological field work. He is the author of various papers on entomological subjects. He is a member of several scientific societies, including the American Association for the Advancement of Science, the Entomological Society of America, the Illinois State Academy of Science, and the Chicago Entomological Society.

Mr. Standley, as Curator Emeritus, will reside permanently in Honduras and there will continue for the Museum his Central American plant studies that have been his principal activity for several years past. He joined the staff of the Museum in 1928 as Associate Curator of the Herbarium and became Curator of the Herbarium in 1937. Mr. Standley was born in Avalon, Missouri, in 1884. He completed his education at Drury College in Springfield, Missouri, and New Mexico State College, Mesilla Park, earning degrees of bachelor of science and master of science at the latter. From 1906 to 1909 he was a member of the faculty at New Mexico State College. In 1909 he was appointed to the botanical staff of the United States National Museum, Washington, D.C., where he served until 1928 and achieved a notable reputation, which was further enhanced by his work later at Chicago Natural History Museum. Mr. Standley is the author of many important botanical works. Among the most notable published by Chicago Natural History Museum are *Flora of Yucatan, Flora of the Lancetilla Valley, Honduras, Flora of Costa Rica, The Forests and Flora of British Honduras* (in collaboration with Samuel J. Record), *Common Weeds*, several families of plants for *Flora of Peru* (by J. Francis Macbride), and *Flora of Guatemala* (in collaboration with Dr. Julian A. Steyermark). Works published by the United States National Museum include *Flora of New Mexico* (in collaboration with E. O. Wooton), *Flora of the District of Columbia* (with A. S. Hitchcock), *Trees and Shrubs of Mexico*, and *Flora of Glacier National Park*. Other publications include monographs of the families Allioniaceae, Chenopodiaceae, Amaranthaceae, and Rubiaceae in *North American Flora*, published by the New York Botanical Garden; *The Flora of Barro Colorado Island*, published by the Arnold Arboretum; and *Lista Preliminar de las Plantas de El Salvador*, in collaboration with Dr. Salvador Caldéron, published privately in San Salvador. Mr. Standley conducted the following expeditions for Chicago Natural History Museum: Sewell Avery Botanical Expedition to Guatemala, 1938–39; Stanley Field Botanical Expedition to Guatemala, 1940–41; Chicago Natural History Museum Expedition to Middle Central America, 1946–47; and expeditions to El Salvador, Honduras, and Nicaragua in 1948, 1949, and 1950.

Promotions

The vacancy in the curatorship of the Division of Insects caused by the retirement of Mr. Gerhard has been filled by appointment of Rupert L. Wenzel as Curator of Insects. Mr. Wenzel first became associated with the Museum as a volunteer assistant in the Division of Insects in 1934 while still a student. After completing his professional preparation at Crane Junior College, Central Y.M.C.A. College, and the University of Chicago, he was appointed Assistant Curator of Insects in 1940.

Also effective January 1, Henry S. Dybas, Assistant Curator of Insects, was promoted to Associate Curator of Insects. Mr. Dybas has been associated with the Museum since 1941, beginning as Assistant in the Division of Insects. He completed his education at Wilson Junior College, Central Y.M.C.A. College, and the University of Chicago.

Dr. Julian A. Steyermark has been appointed Curator of the Herbarium to succeed Mr. Standley. Dr. Steyermark joined the Museum in 1937 as Assistant Curator of the Herbarium and was named Associate Curator in 1948. Dr. Steyermark was educated at Washington University, Henry Shaw School of Botany, and Harvard University and has earned degrees of bachelor of arts, master of science, master of arts, and doctor of philosophy. Before coming to the Museum he was on the staff of the Missouri Botanical Garden in St. Louis, biology instructor in a high school at University City, Missouri, and ecologist and taxonomist on a special survey of the Clark National Forest in the Ozark Mountains of Missouri.

SOCIAL SECURITY EXTENDED TO MUSEUM EMPLOYEES

Effective January 1, employees of the Museum were brought under the provisions of the social security law as recently amended by Congress to cover non-profit institutions of this type. To make this practicable, the Museum's own private pension plan was adjusted by action of the Board of Trustees. The private pension will continue on a modified basis in combination with the social security benefits. The combination of the two will give each employee a considerably larger pension than either plan would provide by itself.

Audubon Society Lecture Offered January 13

The second lecture in the current series of the Illinois Audubon Society will be given Saturday, January 13, at 2:30 P.M. in James Simpson Theatre of the Museum. The lecture is "Saguaroland," by Karl Maslowski of Cincinnati. Mr. Maslowski, distinguished naturalist-photographer, has appeared before audiences in the Museum several times. "Saguaroland," a color film made in Arizona, shows great canyons, desert scenes, birds, and the giant cactus.

Admission is free to the general public.

Potentiality of a Cell

If a single cell, under appropriate conditions, becomes a man in the space of a few years, there can surely be no difficulty in understanding how, under appropriate contions, a cell may, in the course of untold millions of years, give origin to the human race.

HERBERT SPENCER, in *Principles of Biology*

Of all the funny things that live, in
Woodland, marsh or bog
That creep the ground or fly the air, the
Funniest thing's a frog. —ANONYMOUS

NEW RADIOCARBON METHOD FOR DATING THE PAST

By DONALD COLLIER
CURATOR OF SOUTH AMERICAN ETHNOLOGY AND ARCHAEOLOGY

THE COMMONEST and usually the first question asked by visitors to archaeological digs and museums is "How old is it?" This general curiosity about the age of things made by man in the past is shared by archaeologists, for it is impossible to reconstruct the history of ancient civilizations without chronology. In the absence of written records, like those left by the ancient Egyptians and Mayas, archaeologists have had to depend on indirect methods for determining time sequences in the past. The single exception is that of the American Southwest where, thanks to the tree-ring method of dating, it has been possible to trace with great accuracy the history of Indian cultures during the past 2,000 years. The indirect methods, such as stratigraphy, typological cross-dating, and correlation of human remains and artifacts with geological events and climatic changes, are laborious and inaccurate and do not yield dates in years but only relative sequences.

ANCIENT EGYPTIAN BOAT CONFIRMS RADIOCARBON DATING

A piece of one of the deck planks from this exhibit in the Museum's Hall of Egypt (Hall J) was one of the ancient samples of known age used by Dr. Willard F. Libby at the Institute for Nuclear Studies of the University of Chicago to check the radiocarbon method dating. The vessel was a mortuary boat of King Sesostris III of Egypt, who died about 1850 B.C.

The new method of radiocarbon dating, developed by Dr. Willard F. Libby at the Institute for Nuclear Studies of the University of Chicago, promises to revolutionize dating problems in archaeology. This method determines the age of things that lived during the past 20,000 years by measuring the amount of carbon 14 they contain.

Carbon 14 is an unstable (radioactive) heavy form of carbon with an atomic weight of 14. Normal, stable carbon has an atomic weight of 12. The half-life of carbon 14 is about 5,500 years. This means that an ounce of carbon 14 is reduced by decay to half an ounce in 5,500 years, that half the remainder decays during the next 5,500 years, leaving a quarter of an ounce, and so on.

Carbon 14 is constantly being formed in the earth's upper atmosphere as the result of the bombardment of nitrogen-14 atoms by cosmic rays (neutrons). The carbon-14 atoms thus created combine with oxygen to form carbon dioxide, which becomes mixed in the earth's atmosphere with the vastly greater proportion of carbon dioxide containing ordinary carbon atoms. The carbon 14 then enters all living things, which, through the life process, are in exchange with the atmosphere. This exchange is carried out through photosynthesis in plants. Dr. Libby has shown experimentally that all living matter contains a constant proportion of carbon 14, which is about one trillionth of a gram of carbon 14 to each gram of carbon 12. This constant proportion results from the equilibrium between the rate of formation of carbon 14 and the rate of disintegration of the carbon 14 contained in the atmosphere, in the ocean, and in all living things.

When a plant or an animal dies, it ceases to be in exchange with the atmosphere and hence there is no further intake of carbon 14. But the carbon 14 contained at death goes on disintegrating at a constant rate, so that the amount of carbon 14 remaining is proportional to the time elapsed since death. Given the carbon-14 content of contemporary living matter and the disintegration rate of carbon 14 (the half-life), it is possible to calculate the age of an ancient organic sample from the amount of carbon 14 it contains.

SAMPLES ARE BURNED

The laboratory procedure consists of burning the sample to be dated, reducing it to pure carbon, and measuring its radioactivity (rate of atomic disintegration) in a specially constructed, extremely sensitive radiation counter (a form of Geiger counter). The measurement is expressed in terms of the number of carbon-14 disintegrations per minute per gram of carbon. This value is 15.3 for contemporary living samples, 7.65 for samples 5,568 years old, and 3.83 for samples 11,136 years old. Very old samples contain such a small amount of carbon 14 that the error in counting becomes very large, so that the effective range of the method with present techniques is something less than 20,000 years. But there exists a method for enriching or concentrating the carbon 14 in a sample that may make it possible to obtain useful dates back to 30,000 years. At present the year error in dating samples ranges from 5 to 10 per cent.

Although carbon 14 is present in all organic matter, certain kinds of material have been found to be most useful for dating. These are plant material and wood, charcoal, shell, antler, burned bone, dung, and peat. Unburned bone appears to be unreliable because it is more easily altered chemically than these other materials and hence may lose or gain carbon-14 atoms by exchange during the time between death of the animal and the present.

This method has the disadvantage that the sample to be dated must be destroyed by burning. However, in most cases this is not serious because the size of the sample needed is relatively small. The minimum amount of pure carbon necessary for a single counting run (the amount of carbon placed in the Geiger counter) is 8 grams (about a third of an ounce). Since the carbon content of different organic materials varies, the size of the sample needed to yield this much pure carbon also varies. In general, it is necessary to have about 2 ounces of plant material or wood, 1 to 3 ounces of charcoal, 4 ounces of shell, 5 to 10 ounces of dung or peat, and one to several pounds of antler or burned bone. For the greater accuracy obtained by making two independent counting runs these quantities would need to be doubled.

HISTORY OF PROCESS

A brief review of the history of the development of radiocarbon dating will help to make clear the nature of the method. In 1934, shortly after the discovery of artificial radioactivity, Dr. A. V. Grosse predicted the possible existence of radioactive elements produced by cosmic rays. In 1946 Dr. Libby predicted that natural or "cosmic" carbon 14 would be found in living matter. The following year he and Grosse checked this hypothesis by testing methane gas derived from sewage (an organic product) and found carbon 14 to be present in the expected amount.

The next step was to test the assumption that carbon 14 was present in the same concentration in all living matter. This research, called by Dr. Libby a "world-wide assay of natural radiocarbon," consisted of measuring the carbon-14 content of contemporary living material from various parts of the world, various latitudes, altitudes, and geographical situations. This Museum contributed to this part of the research by furnishing from the botanical and anthropological collections wood samples from the

Pacific Ocean, South America, Europe, Africa, and the Near East. These measurements, made by Dr. E. C. Anderson, confirmed the assumption and established the value for the carbon-14 content of present-day living matter.

EGYPTIAN BOAT PLANK USED

The next phase, carried out by Dr. J. R. Arnold and Dr. Libby, consisted of testing the dating method by measuring some ancient samples of relatively accurately known age. These were wood from Egypt and Syria, a sample of wood dated by tree-rings, and a piece of old redwood. They ranged in known age from 1,300 to 4,600 years. One of the Egyptian samples, which was supplied by this Museum, was a piece of deck plank from the mortuary boat of King Sesostris III, who died about 1849 B.C. This boat is on display in the Hall of Egyptian Archaeology (Hall J). The dates obtained on this and the other samples agreed with the known ages within the calculated error of the method.

The final phase of this research has consisted of further checking of the method by dating selected archaeological and geological samples of unknown age. An effort was made to obtain from various parts of the world samples whose relative age had been established by the usual archaeological and geological methods. In some instances it was possible to secure several samples coming from different layers of a single stratified deposit. These stratified series were particularly valuable in testing the consistency of the carbon-14 dates obtained. Up to the present more than 150 samples of unknown age from North and South America, Europe, and the Near East have been dated. These range in age from a few centuries to more than 20,000 years, and relate to the problems of dating early man in North and South America; the Archaic Indian cultures of the eastern United States; the early cultures of the Southwest, Mexico, and Peru; the Late Paleolithic, Mesolithic, and Neolithic periods in Europe and the Near East; and the last glaciation in North America and Europe.

TEST MUSEUM SPECIMENS

Among these samples were several furnished by this Museum. Two were portions of wooden implements from the Early Nazca culture on the south coast of Peru, excavated by a Museum expedition in 1926. Dr. Libby's results show them to be about 2,000 years old, which is consistent with other carbon-14 dates obtained from Peruvian samples. Two other samples were charcoal from hearths belonging to the Chiricahua stage of the Cochise culture in western New Mexico. These hearths were discovered by the Museum's 1950 Southwest Archaeological Expedition. The carbon-14 date indicates that these hearths were in use about 2500 B.C. This date is consistent with one obtained from a site of the Chiricahua stage in Arizona. Samples of charcoal, bark, and wood from the Hopewell culture of Ohio (Hall of Indians before Columbus—Hall 4) were also given to Dr. Libby. These turned out to be considerably older than archaeologists had believed.

Full assessment of the results of the final phase of Dr. Libby's research on radiocarbon dating has not been made. But the general consistency of the results, including the dates on samples from periods older than 5,000 years, for which there are no absolute dates for checking, leaves little room for doubt that the method is sound and that dates accurate within the experimental error of the method can be obtained. Radiocarbon dating is destined to have a very important role in archaeology, both in increasing the accuracy of its findings and in reducing the amount of time and effort devoted to problems of dating. This will mean that, in the future, archaeologists can move on with greater facility to the syntheses and generalizations that are the ultimate aim of their work.

The method will be extremely useful also in the aspects of geology, paleontology, and paleobotany dealing with events and processes that occurred during the past 30,000 years. Dr. Libby has already obtained dates relating to the time of the last glaciation in North America and Europe. These dates indicate that the last glaciation was considerably more recent than accepted geological estimates. It will be possible with additional work to date the retreat of the glaciers quite accurately, and this information will have a crucial bearing on time estimates for the whole Pleistocene period, which is variously estimated to have lasted from 400,000 to 1,000,000 years. Radiocarbon dating will also give more reliable information on the time required for the formation of new species among plants and animals. In these and many other ways carbon-14 dating promises to be an extremely important scientific tool.

NEW MEMBERS

The following persons became Museum Members between November 16 and December 15:

Contributors

Miss Lillian A. Ross

Associate Members

John T. Beatty, Miss Margaret B. Conover, Paul William Cutler, Philip S. Goldberg.

Annual Members

Hilmar A. Andresen, Meyer Birk, Herman H. Bruns, Mrs. Ruth Orton Camp, V. F. Chappell, Bernard W. Culver, I. Dobkin, Dr. Chester J. Farmer, A. E. Gibbs, J. W. Huddleston, N. J. Lavezzorio, F. B. Milhoan, Earl W. Muntz, E. H. Omara, Lester C. Rogers, James F. Ronayne, William L. Runzel, Jr., Bernard G. Sang, Fred M. Schwarz, N. Raoul Sklar, Stewart Tauber, Reno R. Walker.

FIFTY YEARS AGO AT THE MUSEUM

Compiled by MARGARET J. BAUER

From the *Annual Report of the Director* for the year 1901:

"*Publications.*—This means of recording the results of original research and also of recent acquisitions proves eminently satisfactory, and, judging from the complimentary references made from time to time by prominent scientists and journals, the standard reached is very high." *A Synopsis of the Mammals of North America and the Adjacent Seas* was complimented as follows: " 'The book is well printed, though on glazed paper that is probably ill-adapted to withstand constant use. This, however, was rendered necessary by the profuse half-tones with which the text is illustrated. As if to compensate for the brevity of the text, the book is illustrated with a profuseness hitherto unknown in similar works. The plates and text figures contain half-tone reproductions of photographs of the skull and teeth of at least one representative of nearly every genus and sub-genus. The standard of excellence of these figures is very high, and no equally successful application of photography to zoological illustration on so extensive a scale has hitherto been made.' "

African wart hog group, originally installed in 1901 by the late Carl E. Akeley, who collected the specimens. It is now on exhibition in Carl E. Akeley Memorial Hall (Hall 22).

"*Installation.*—A striking group of the northern Wart Hog was placed on exhibition in the West Court and has already attracted much attention." This group was collected and prepared by Carl E. Akeley.

False facts are highly injurious to the progress of science, for they often endure long; but false views, if supported by some evidence, do little harm, for everyone takes a salutary pleasure in proving their falseness.

CHARLES DARWIN, in *The Descent of Man*

DALLWIG TO LECTURE ON LIVING RACES

"Living Races and Their Way of Life" is the title of the Sunday afternoon lecture to be given during January by Paul G. Dallwig, the Layman Lecturer. Mr. Dallwig will present this lecture on January 7, 14, 21, and 28.

In this lecture Mr. Dallwig takes his listeners on an imaginary trip around the world, from the depths of jungle forests to the palaces of princes. He illustrates his lecture with the 101 bronzes made by Malvina Hoffman depicting the various living races of mankind, the finest exhibition of racial portraiture to be found anywhere in the world, and weaves a human-interest story around each one of these bronzes.

The lectures will begin at 2 P.M. and end at 4:30 P.M. Midway there will be an intermission for tea and other refreshments in the Museum Cafeteria.

Members of the Museum may use their membership cards to attend these lectures without advance reservations. All others, except out-of-town visitors and representatives of the press, must make advance reservations to attend the Sunday lectures. Reservations may be made by mail or telephone (WAbash 2-9410). The lectures are free.

Mr. Dallwig will not appear at the Museum during February because of an out-of-town lecture tour. He will return in March to present "Behind the Scenes in Our Museums."

STAFF NOTES

Karl P. Schmidt, Chief Curator of Zoology, last month attended the Conference on the Caribbean at Mid-Century, held at the University of Florida, in Gainesville. He participated in the round-table discussions of Caribbean problems and served as consultant on museum techniques for the Department of Biology at the university .... **Henry S. Dybas,** Associate Curator of Insects, left late in December for studies of collections at the U. S. National Museum in Washington, D.C., the Philadelphia Academy of Sciences, the American Museum of Natural History in New York, and the Museum of Comparative Zoology at Harvard University .... **Miss Elaine Bluhm,** assistant in anthropology, presented a paper before the American Anthropological Association meeting in Berkeley, California, on sandals found last summer in Tularosa Cave, New Mexico, by the Museum's Archaeological Expedition to the Southwest .... **Dr. Theodor Just,** Chief Curator of Botany, and **Dr. Hugh C. Cutler,** Curator of Economic Botany, recently conducted several botanical seminars at the University of Illinois, Urbana. Dr. Cutler also lectured before the Botany Club at the University of Chicago on "The History of Corn." .... **Dr. Julian A. Steyermark,** Curator of the Herbarium, lectured last month before the Men's Garden Club of Mundelein and Libertyville.

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the last month:

Department of Anthropology:

From: Estate of Susie I. Grier—65 specimens of ethnological material, United States, Panama, and Dutch Guiana.

Department of Botany:

From: Dr. L. J. Gier, Liberty, Mo.—43 specimens of algae, Missouri; Dr. H. B. S. Womersley, Adelaide, South Australia—32 specimens of algae, South Australia; Dr. Isabella A. Abbott, Pacific Grove, Calif.—109 specimens of algae, Hawaiian Islands; Herman Silva, East Lansing, Mich.—234 specimens of algae, Tennessee and adjoining states; Donald Richards, Chicago—199 cryptogams, Mt. Shasta, Calif.; Dr. Chester S. Nielsen, Tallahassee, Fla.—131 specimens of algae, North Carolina and Florida; Dr. Walter Kiener, Lincoln, Neb.—305 specimens of algae, Nebraska; Dr. Chester S. Nielsen, Tallahassee, Fla., and William Culberson, Cincinnati—82 specimens of algae, North Carolina and Tennessee.

Department of Geology:

From: Saskatchewan Provincial Museum, Saskatchewan—a fossil jaw, Canada; Allen M. Hard, Tuscaloosa, Ala., and Robert H. Hard, Flint, Mich.—fossil turtle fragments, Alabama; University of Tennessee, Knoxville—cast of fossil turtle fragments.

Department of Zoology:

From: Boardman Conover (deceased)—approximately 18,000 game birds; Walther Buchen, Chicago—128 bats and a bird skin, Kenya Colony, Africa; Harry Hoogstraal, Cairo, Egypt—6,802 insects and allies; Chicago Zoological Society, Brookfield, Ill.—3 mammals and 6 birds; Lincoln Park Zoo, Chicago—5 adult and 6 newborn jerboas; John G. Shedd Aquarium, Chicago—91 fishes; Dr. Sidney Camras, Chicago—678 pinned and identified flies, United States; Margaret G. Bradbury and Phyllis A. Madden, Chicago—2,823 fishes, comprising 99 lots of 28 species, Illinois; Peabody Museum, Cambridge, Mass.—86 fishes of 16 species, Red Sea, and a collection of 10 lots of various invertebrates, Iran, Iraq, and Saudi Arabia; Col. Luis E. Pena, Santiago, Chile—a catfish, Bolivia, and 2 fly paratypes, Chile; N. L. H. Krauss, Honolulu, Hawaii—8 lizards, Fiji Islands, and a snake, Dominican Republic.

From: Colin C. Sanborn, Highland Park, Ill.—a bird skin, Illinois; William J. Gerhard, Chicago—a bird skin, Illinois; Harvey M. Goldschmidt, Putnam Valley, N.Y.—93 lizards, snakes, frogs, and salamanders, United States; Dr. Maurice L. Richardson, Lansing, Mich.—a collection of 26 marine shells, California; Joseph H. Shirk, Peru, Ind.—3 brown-bear skulls, Arizona; Ross Tarrant, Walworth, Wis.—2 snakes, Wisconsin; Macy Parkman, Mt. Sterling, Ill.—a bird skin, Illinois; Lillian A. Ross and Laura Brodie, Chicago—a snake, Indiana; Dr. Orlando Park, Evanston, Ill.—311 specimens of fishes comprising 16 species; H. E. Woodcock, Chicago—4 butterflies, Nova Scotia and New Brunswick; Richard Russell, Belleville, Ill.—14 specimens of land shells, Illinois.

Library:

From: Estate of Susie I. Grier; Dr. Henry Field, Washington, D.C.; William Wardwell, Chicago.

Technical Publicatons Issued

The following technical publications were issued recently by Chicago Natural History Museum:

Botanical Series: Vol. XIII, Part III, No. 3. *Flora of Peru.* By J. Francis Macbride. November 17, 1950. 222 pages.

Fieldiana: Zoology, Vol. 31, No. 40. *Report on a Collection of Birds from Oaxaca, Mexico.* By Emmet R. Blake. November 29, 1950. 26 pages. $0.25.

JANUARY LECTURE TOURS, DAILY EXCEPT SUNDAY

Tours of exhibits, under the guidance of staff lecturers, are conducted every afternoon at 2 o'clock, except Sundays and certain holidays. On Mondays, Tuesdays, Thursdays, and Saturdays, general tours are given covering all departments. Special subjects are offered on Wednesdays and Fridays. A schedule of these follows:

Wed., Jan. 3—The Land of the Mummies (*June Buchwald*).

Fri., Jan. 5—Animals in Action. Illustrated introduction in Meeting Room (*Jane Sharpe*).

Wed., Jan. 10—Climate: Cause and Effect (*Anne Stromquist*).

Fri., Jan. 12—Chinese Fundamentals: Ancient Foundations of the Chinese Way of Life. Illustrated introduction in Meeting Room (*Harriet Smith*).

Wed., Jan. 17—Natural Storage of Food: Seeds, Roots, and Other Plant Parts (*Miriam Wood*).

Fri., Jan. 19—The Indian and His Art. Illustrated introduction in Meeting Room (*June Buchwald*).

Wed., Jan. 24—Circus Animals (*Jane Sharpe*).

Fri., Jan. 26—Plant Adventurers: Heroes, Fighters, Killers, and Acrobats. Illustrated introduction in Meeting Room (*Marie Svoboda*).

Wed., Jan. 31—Denizens of the Deep: Marine Animals (*Lorain Farmer*).

Persons wishing to participate should apply at North Entrance. Tours are free. The Museum will be closed on New Year's Day.

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BULLETIN

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Chicago Natural History Museum

6th Chicago International Nature Photo Exhibit
February 1-28

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

Roosevelt Road and Lake Shore Drive, Chicago 5

TELEPHONE: WABASH 2-9410

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THE BULLETIN

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CLIFFORD C. GREGG.....*Director of the Museum*

CONTRIBUTING EDITORS

PAUL S. MARTIN.....*Chief Curator of Anthropology*
THEODOR JUST.....*Chief Curator of Botany*
SHARAT K. ROY.....*Chief Curator of Geology*
KARL P. SCHMIDT.....*Chief Curator of Zoology*

MANAGING EDITOR

H. B. HARTE.....*Public Relations Counsel*

Members are requested to inform the Museum promptly of changes of address.

UNIVERSITY MUSEUMS

A HUNDRED YEARS ago, indeed little more than fifty years ago, the teaching of zoology and botany in the colleges and universities of North America was accomplished mainly by means of museum collections. Every such institution, in effect, maintained a museum. The remarkable Ward's Natural Science Establishment at Rochester, New York, supplied specimens to such museums and built up a most extraordinary business in minerals and fossils and zoological specimens of all kinds. In addition, Professor Henry A. Ward, its founder, actively promoted the organization of museums of this kind, both at colleges and universities and as municipal museums in the larger cities.

When the biologists at universities, at about the turn of the century, turned their attention to the experimental fields of physiology and embryology and genetics, studies of systematic zoology and botany tended to be more and more neglected, and this had as an inevitable result the neglect of museum collections and the decline of the university and college museum. Where some well-established "Old Bison" of zoology continued to accumulate specimens—we may remember the great Eigenmann collection of South American fishes at Indiana University—it became a strictly departmental collection, and without a strong museum organization to retain it, it was dispersed or sold when the department leadership changed. The teaching museum, and with it research in systematic zoology and often in systematic botany as well, all but disappeared from the American collegiate scene.

In a few places, where there had been an especially powerful impetus to museum studies in the last century, as was the case at Harvard, or where some strong personality gave impetus to renewed studies that required museum material and a museum, as at the University of California, the university museum has remained strong or has renewed its vitality. The Museum of Comparative Zoology at Harvard had the advantage of the immense prestige of Louis and Alexander Agassiz and of an independent organization and independent funds. The University Museums at the University of Michigan underwent reorganization in the 1930's under Alexander G. Ruthven, emerging as the Museums of Anthropology, Paleontology, and Zoology, with the University Herbarium, loosely associated under a general director and housed in a single building. At Stanford University and at the universities of Kansas and Oklahoma, museum departments were maintained and have undergone renewed growth. Scattered over the country are other museum nuclei, often of fossils or of insects, in which fields systematic studies and museum material remain essential for teaching or research.

Elsewhere the storage of university collections has been precarious, and it has often been necessary to find a safer and more permanent repository for valuable material. Fortunately the larger municipal museums have grown up during the very period of decline of the college museum, and these have welcomed some of the collections discarded by universities and colleges, sometimes purchasing them at a fraction of their cost and sometimes actually rescuing them from the dump.

Renewal of interest in the study of the species of animals and plants and in the principles involved in their classification has been evident in the decade since 1940. In part this is the result of a change of direction in the interest of the students of genetics from the laboratory to the outdoor "laboratory of nature." This has been accompanied by university recognition of the science of ecology, a synthetic biology that studies the interaction of plants and animals and their joint dependence on the environment, and thus again takes the professor to the field. It is, therefore, not surprising that there should be signs of active new developments of university museums—at the University of Illinois, at the various branches of the University of California, at the University of Florida, and elsewhere. It seems not impossible that we may witness a complete revival of museum interest and that it will become not only useful but even again fashionable to maintain a museum in connection with our institutions of learning.

The larger museums have lived through the whole cycle of rise and decline and revival of the university museum, witnessing the decline with dismay and welcoming the revival as a sensible return of attention to the foundations of the natural sciences, especially in anthropology, botany and zoology, and geology.

KARL P. SCHMIDT
Chief Curator of Zoology

THIS MONTH'S COVER

"Volcán Llaima" is the title of the cover picture. It is a photograph by Eric L. Bertens, of Santiago, Chile, who has entered it in the Sixth Chicago International Nature Photography Exhibition to be held at the Museum, February 1–28. The exhibition is sponsored jointly by the Museum and the Nature Camera Club of Chicago.

Election of Museum Officers

At the Annual Meeting of the Board of Trustees held January 15, Stanley Field was re-elected President of the Museum. This will be Mr. Field's 43rd consecutive year in that office. All other officers were re-elected. They are: Marshall Field, First Vice-President; Albert B. Dick, Jr., Second Vice-President; Samuel Insull, Jr., Third Vice-President; Solomon A. Smith, Treasurer; Colonel Clifford C. Gregg, Director and Secretary; and John R. Millar, Assistant Secretary.

John S. Guggenheim Fellowship Awarded to Dr. Cuatrecasas

Dr. José Cuatrecasas, Curator of Colombian Botany, completed his contract with the Museum in December, 1950. Starting January 1, 1951, he assumed his new status as a John Simon Guggenheim Fellow. He received this fellowship in recognition of his distinguished work on the botany of Colombia. While a Guggenheim Fellow, Dr. Cuatrecasas will prepare a critical catalogue of all plants known to occur in Colombia, using his own extensive collections as the basis for this work.

Museum Attendance Rises

The number of visitors admitted free to the Museum in 1950 increased to 1,052,420, while the number of adults paying the nominal admission charge on certain days decreased to 121,241. Children, students, teachers, and Museum Members are always admitted free. The total attendance for 1950, free and paid, was 1,173,661, a slight increase over the total of 1,145,359 recorded in 1949.

MUSEUM RECORDER RETIRES FROM POSITION

Mrs. Michael J. (Elsie H.) Thomas, Recorder of the Museum for many years, will retire from her position on February 1. Mrs. Thomas has been employed by the Museum since 1922. She began as a secretary in the office of the President, became Assistant Recorder in 1924, and Recorder in 1926. Her duties have been dual: she not only has been in charge of maintaining the records of accessions in all of the scientific departments and other divisions of the Museum—a task requiring accuracy in keeping track of hundreds of thousands of specimens—but she has also administered the Division of Publications. In the latter capacity she has supervised the distribution of thousands of scientific works published by the Museum and circulated to all parts of the world in exchange with other scientific institutions and individual scientists. It has also been her responsibility to keep classified statistics of Museum attendance, making daily, monthly, and annual reports covering the various classes of admissions—free, paid, special, Members, and others. Meticulous attention to the smallest details and high standards of efficiency were characteristic of her service.

ELSIE H. THOMAS

Mrs. Thomas is a native of Iowa. In leaving the Museum she takes with her the gratitude of the institution for her devotion to her work over the years and the friendship of the Museum staff. All join in wishing her many happy years in her retirement.

Technical Publications Issued

The following technical publications were issued recently by Chicago Natural History Museum:

Fieldiana: Zoology, Vol. 32, No. 7. *Birds of the Acary Mountains, Southern British Guiana.* By Emmet R. Blake. December 19, 1950. 60 pages.

Geological Series: Vol. VII, No. 9. *The Smithonia Meteorite.* By Sharat Kumar Roy and Robert Kriss Wyant. December 22, 1950. 6 pages. $0.15.

Geological Series: Vol. VII, No. 10. *The La Porte Meteorite.* By Sharat Kumar Roy and Robert Kriss Wyant. December 22, 1950. 10 pages. $0.25.

Fieldiana: Geology, Vol. 11, No. 2. *Diplocaulus, A Study in Growth and Variation.* By Everett Claire Olson. January 12, 1951. 116 pages.

STAFF NOTES

At the request of the Pacific Science Board of the National Research Council, **Dr. Alexander Spoehr,** Curator of Oceanic Ethnology, went to Washington to participate in a special conference, January 12, on coral atoll ecological research .... **Donald Collier,** Curator of South American Ethnology and Archaeology, recently gave an illustrated lecture on Peruvian archaeology and a talk on carbon-14 dating at the University of Illinois, Urbana. Curator Collier and **Dr. John B. Rinaldo,** Assistant in Archaeology, were interviewed respectively on carbon-14 dating and the Museum's excavations at Tularosa Cave, New Mexico, for the program entitled "Great Stories in Corn," which is broadcast over the NBC network.

Public School Executives on Museum Visit

The administrative and supervisory staff of the Chicago Public Schools held a meeting at the Museum on January 6 to review the educational services offered for children by this institution. Herold C. Hunt, General Superintendent of the school system, presided. The entire staff of the Raymond Foundation, headed by Miss Miriam Wood, presented the program, which began with introductory talks in the James Simpson Theatre and the showing of a new Museum film, "Through These Doors." This was followed by Museum tours showing the latest additions to the exhibits and a few of the exhibits most often requested by school groups. Dr. Sharat K. Roy, Chief Curator of Geology, and his staff were hosts to the educators in a preview of the new geology hall now under preparation, in which fossil invertebrates and fossil plants are to be exhibited (Frederick J. V. Skiff Hall—Hall 37).

Sunday Layman Lectures Resume in March

Because of a lecture tour to other cities Paul G. Dallwig, the Layman Lecturer, will suspend his Sunday afternoon lectures at the Museum during February but will resume them on the four Sundays in March (March 4, 11, 18, and 25). In that month his subject will be "Behind the Scenes in Our Museums." Advance reservations (except for Museum Members) are necessary for all of the Layman Lectures and during Mr. Dallwig's absence in February will be taken for the March dates either by mail or telephone (WAbash 2-9410). Members of the Museum are admitted upon presentation of their membership cards. The lectures are free.

NATURE PHOTO EXHIBIT, FEBRUARY 1 TO 28

The Sixth Chicago International Nature Photography Exhibition, sponsored jointly by the Museum and the Nature Camera Club of Chicago, will open in Stanley Field Hall of the Museum on February 1 and continue through February 28. From several thousand entries submitted by both professional and amateur photographers in all parts of the United States and many foreign countries approximately 200 of the best black-and-white prints and 700 color slides have been placed on display. The number of entries has increased from year to year.

The selections were made by a panel of judges using the exacting standards of the Photographic Society of America, which rates the annual show at this Museum as a "Class A" exhibit. This exhibition is the largest of its kind in the world devoted exclusively to nature photography, and despite its specialized field it is larger than many pictorial exhibitions that are unrestricted in subject matter. The judges this year were: Conrad Emanuelson, A.R.P.S., photographer; John W. Moyer, in charge of Division of Motion Pictures at the Museum; R. Marlin Perkins, Director of Lincoln Park Zoo; Merrill Tilden, photographer; and Rainer Zangerl, Curator of Fossil Reptiles at the Museum.

The exhibition is composed of two main divisions—prints and color slides. In each division are three classifications: *Animal Life*, *Plant Life*, and *General*. Silver medals and ribbons will be awarded in the various print and slide classifications. The names of the prize winners will be inscribed on the Myrtle Walgreen plaque. The prints are displayed in fluorescent-lighted panels built especially for this purpose. The slides are displayed in rotation in a display cabinet. They will also be projected on the screen in the James Simpson Theatre on two Sunday afternoons, February 11 and 18, at 3 P.M.

An illustrated catalogue of the exhibit, available early in March, will be published by the Nature Camera Club. A list of the prize winners and reproductions of some of their entries will appear in the March BULLETIN.

Audubon Lecture February 10

The Illinois Audubon Society will present the third lecture in its current series on Saturday, February 10, at 2:30 P.M., in the James Simpson Theatre of the Museum. William Ferguson, of Omaha, Nebraska, will lecture on "This Curious World in Nature." The lecture will be illustrated with natural-color motion pictures made in Colorado. The film stresses the danger to natural resources from vandalism and forest fires. Admission is free to the general public.

THE OLDEST CORN IN THE WORLD

By HUGH C. CUTLER
CURATOR OF ECONOMIC BOTANY

Last summer the Museum's Southwest Archaeological Expedition dug up the best series of archaeological remains of food plants ever discovered in North America. In Tularosa Cave, a dry cave in west-central New Mexico, the archaeologists uncovered well-preserved remains of the most important native American food plants: corn, beans, and squash, as well as gourds, sunflowers, an edible desert primrose, cacti, and grasses. In addition there were strings, ropes, sandals, and baskets made of fibers from grasses, agaves, yuccas, and cedar bark. There is an abundance of material, most of it corn. In the collection are about 38,000 corncobs, some entire and still bearing grains, fragments of roots, stems, and tassels. In even the lowest and oldest levels of the cave, corn was the most abundant food plant present.

Fig. 1. Varieties of corn. Left to right: Popcorn, flint, dent, flour, sweet, and pod corn.

It is believed that corn from the lowest levels of the cave may be the oldest yet known. Some of the ears are the most primitive kinds that have yet been unearthed. A definite date has not been assigned to the lowest levels, but stone tools found there are very similar to those found in nearby sites that have been dated at about 2500 B.C. by the radiocarbon method described by Curator Donald Collier in the BULLETIN of January, 1951.

YEARS OF DEVELOPMENT

Most corn grown in the United States today is a highly developed product, the result of years of effort by the Indians, followed by intensive selection by white farmers and, more recently, by scientific breeding done by corn geneticists. Corn is our most important crop and covers more than one-quarter of our croplands each year. We grow about 60 per cent of the corn of the world, so much that there are about 1,300 pounds of corn for each person each year in the United States. Unlike the Indians of Tularosa Cave, however, we eat very little of this as corn. About 80 per cent of it is fed to animals in the region in which the corn is grown and we consume it as pork or beef. A large part of the remainder is used in industry to make commercial starches and sugars, alcohols, whiskey, beer, syrups for soft drinks, and a host of minor products. Paper, for example, is often coated with a sizing containing corn products, while printing inks for paper or textiles contain corn products to give the ink body. Relatively little of our corn is used in such obvious ways as corn on the cob, popcorn, or corn flakes.

Corn is usually classified by the character of the grains, for it is this part that is used most often. In popcorn, with the exception of the embryo, most of the grain is filled with a hard translucent or horny material and there is very little soft starch within the grain (*Figs. 1 and 2*). In flint corn there is much more of this soft starch, although the kernel is still completely enclosed by the hard starch. In the dent corns, the kind of corn grown throughout our Corn Belt and generally called field corn, the hard material is confined to a band about the kernel, and the soft starch reaches up to the cap of the grain. In flour corn nearly all the storage material is soft and floury. The grains of a sweet corn like Golden Bantam are filled with a translucent and sweet material that, when it dries, shrinks, and the grain becomes wrinkled.

Fig. 2. Diagrams of corn grains cut longitudinally. Left to right: Popcorn, flint, dent, flour, sweet, and pod corn.

PROTECTIVE FEATURES

This classification is practical for users of corn, but for studying the development of corn from the primitive forms grown by the Indians who first occupied Tularosa Cave other characters are more important. One of these characters is the way in which the individual grains are protected on the ear.

In a kind of corn called pod corn, individual grains are completely surrounded by the chaffy material that surrounds only the base of most corn and usually is not seen until the grains are removed. In pod corn this protective covering is so large (*as in the ear to the right in Fig. 1*) that the grains often are completely concealed. Some ears from the lower levels of Tularosa Cave are of this type (*shown in Fig. 3*). The ear to the left still has all of its grains and each of these is almost completely covered. The two ears to the right have lost their grains, but the cover that once concealed each grain is evident. These are the extremes; yet most of the ears in the lower levels have well-developed protective covers. In most grasses the grains are enclosed by similar structures, and it is likely that the grains in wild corn were thus protected. Pod corn, then, is primitive in this respect. In later levels there is a gradual reduction of the covers, a sign that the Indians selected corn with more grains and ears that would be easier to shell than pod corn.

There is very little variation in the oldest corn ears. Most of the ears are small and nearly of the same size and shape. The amount of variation increased and as one approached the top levels of the cave most of the kinds of corn that are grown in the same region today can be found. Here in Tularosa Cave is a history of plant breeding that covers about 3,000 years.

TRACING PLANT HISTORY

The story for other cultivated plants can never be so complete as that for corn. Corncobs are usually brought to the house and the grains removed there. The cobs are then discarded, usually in a refuse heap, but often they are just left about the dwellings, as was the case of the material that the Museum expedition recovered. In other plants there are few parts that are brought back to the house and then discarded. Beans, for example, are usually picked in the pod when dry, dried some more in the sun, and, after they have been flailed or trampled, winnowed in a windy spot to remove the crushed bean-pod fragments. Occasional bean seeds are lost in the refuse but this is quite rare. Thus, the rarity of bean remains, especially in the lower levels of the cave, does not mean that beans were uncommon.

Fig. 3. Ancient ears of pod corn found in Tularosa Cave, New Mexico, by the Museum's Archaeological Expedition to the Southwest in the summer of 1950. Approximately 4,000 years old, these are the most primitive ears of corn ever discovered.

Remains of squashes are usually confined to stems and fragments of the rind. Indians used the seeds as well as the fleshy parts of the squash. This is unfortunate because the principal diagnostic characters of some squashes are found in the seeds and stems. Stems are often broken off in the field and so their frequency in rubbish heaps is no indication of the amount of squash consumed.

One of the common food plants found in the lower levels of the cave was the wild gourd, *Cucurbita foetidissima*. It is closely

related to the squash and still grows wild in the same region. The flesh of most of the wild gourds is bitter, although there are occasional ones that can be eaten. Usually only the seeds are used, roasted, so that there is an abundance of the discarded fragments of rind with attached fibrous flesh. There are many kinds of these wild gourds, most of them used by the natives of North America for their seeds. It is likely that some of them are ancestral forms of the cultivated squashes and pumpkins. Some wild gourds are perennials and develop large starchy roots that can be eaten. Occasional fragments of a starchy root in the Tularosa Cave remains appear to be of the wild gourd.

There were fragments of the cultivated bottle gourd, Lagenaria, in all layers of the cave. The bottle gourd is the only cultivated plant that is known to have been cultivated in both the Old and the New World before the time of Columbus. It originated in the Old World, for there are many varieties there, and spread to the New World very early, probably by floating in the sea. While it is used here only for water jars and containers, in the Old World the young fruits are often eaten. They are rather tasteless, however, and the fact that our Indians did not eat them may be considered as evidence of the superiority of available New World foods and the discrimination of their growers.

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the past month:

Department of Botany:

From: Dr. Violet M. Diller, Cincinnati, Ohio—28 algal cultures; Henry S. Dybas, Chicago—27 specimens of fungi, Illinois, Indiana, and Wisconsin; Donald Richards, Chicago—625 miscellaneous cryptogams; Carnegie Institution of Washington, Stanford, Calif.—91 phanerogams, United States; Bureau of Forestry, Manila, P. I.—22 hand-specimens of wood, Philippine Islands.

Department of Geology:

From: University of Chicago, Chicago—3 fossil reptile specimens, Texas.

Department of Zoology:

From: Lincoln Park Zoo, Chicago—a gorilla (Bushman); Chicago Zoological Society, Brookfield, Ill.—4 bird skins; John G. Shedd Aquarium, Chicago—a red-tailed catfish, Amazon basin; Fisheries Department, Sandakan, North Borneo—89 fishes (marine and fresh-water) representing 34 species, North Borneo; Major Robert Traub, Washington, D.C.—3 rodents, England; Macy Parkman, Mt. Sterling, Ill.—a bird skin, Illinois; Robert Fleming, Mussoorie, India—133 insects and allies, India; Harold Hanson, Urbana, Ill.—5 Canada goose skeletons, Illinois; Dr. Stanley Auerbach, Evanston, Ill.—164 insects and allies, United States; Loren P. Woods and family, Richton Park, Ill.—18 cypress swamp fishes, South Carolina.

FIFTY YEARS AGO AT THE MUSEUM

Compiled by MARGARET J. BAUER

From the *Annual Report of the Director* for the year 1901:

"*Bequest.*—The sum of $1,000.00 was bequeathed to the Museum by the late Huntington W. Jackson. This brings to mind the fact that the President during the year supported the movement to amend the law regarding the Inheritance Tax, and the Museum is to be congratulated on the success with which the concerted efforts of the various institutions in the country have been crowned, the objectionable law having been repealed by the United States and the State of Illinois. . . .

"*Installation.*—The Curator of the Department of Zoology reports that several of the divisions are exceedingly cramped for room and that further installation of specimens in these divisions will be difficult."

SPRING LECTURES, MOVIES FOR ADULTS, CHILDREN

The annual Spring Course of free illustrated lectures for adults on science and travel and the Raymond Foundation free motion-picture programs for children will begin on March 3. These presentations will continue on each Saturday afternoon and morning throughout March and April.

"Alluring Alaska," the first lecture for adults, will be illustrated with motion pictures in color. Frederick Machetanz of Kenton, Ohio, who since 1935 has traveled more than 76,000 miles over all areas of Alaska, is the lecturer on March 3. The lecture will be given in the James Simpson Theatre of the Museum at 2:30 P.M. Reserved seats are available to Members upon application in advance.

The same film and a special version for children of the same lecture will be given by Mr. Machetanz on the morning program for March 3. The children's program will begin at 10:30 A.M.

A complete schedule of programs of both adult and children's series will appear in the March issue of the BULLETIN.

Library:

From: American Anthropological Association, Andover, Mass.; Dr. Henry Field, Washington, D.C.; Dr. Maurice L. Richardson, Lansing, Mich.; Dr. Robert H. Denison and Prof. Frederick Eggan, both of Chicago.

Raymond Foundation:

From: Estate of Susie I. Grier—214 specimens of ethnological material, 52 books and other publications; John R. Millar, Chicago—3 kodachrome slides; Ronald J. Lambert, Zion, Ill.—3 kodachrome slides.

MUSEUM RECEIVES PLANTS COLLECTED AT INCHON

It is not often that current military events have a direct bearing on Museum work, but they did during the recent Inchon invasion in Korea. An officer in the U. S. Marines, who landed at Inchon, happened to be a member of the Wood Collectors Society. This is a "non-profit organization of scientists, botanists, wood technologists, wood collectors, hobbyists, and craftsmen, for mutual reciprocation and assistance," and its secretary, Archie F. Wilson, of Flossmoor, Illinois, is a frequent visitor in the Herbarium of Chicago Natural History Museum. Specimens, sent for identification to Mr. Wilson by members of this society, are often forwarded by him to the Museum. In the present instance, this marine officer apparently landed, as Mr. Wilson writes, "with a gun in one hand and a saw in the other. He has shipped me several logs from there, along with two he could not identify and from which he took the enclosed herbarium material."

The two specimens received belong to the conifers, one being a species of fir and the other a species of arbor vitae, the latter sometimes known as white cedar in the eastern United States. Although these Korean plants represent species different from those found in the United States, they illustrate the close relationship existing between the present floras of eastern Asia and North America, especially eastern North America. This relationship of the floras of these widely separated areas is the result of former connections that existed between Asia and North America millions of years ago. After the land connections between these continents were cut off, the ancestors of our firs, arbor vitaes, and many other genera of plants gave rise to different species on the two continents.

Various ornamental plants native to Korea have long been favorites in the United States among horticulturists and flower-lovers in general. For example the beautiful and showy royal azalea (*Rhododendron Schlippenbachii*), a native of the mountains of Korea, is successfully grown in the eastern and southern United States as well as in the Chicago area. It is one of the earliest of the azaleas to bloom outdoors in this region. The Chinese or Oriental arbor vitae (*Thuja orientalis*), a native of Korea, Manchuria, and northeastern China, is a beautiful evergreen commonly planted in the southern and Pacific states of this country. —J.A.S.

Mrs. Lura Smith, of Pyengyang, Korea, a missionary worker who mounted plants for two summers in the Museum Herbarium and then returned to Korea, has made a collection of more than 350 Korean plants and sent them to the Museum.

SAILOR-ANTHROPOLOGISTS OF THE 18th CENTURY

By GEORGE I. QUIMBY
CURATOR OF EXHIBITS, ANTHROPOLOGY

IN THE last quarter of the 18th century there were four important voyages of exploration made to the Pacific islands and the northwest coast of America under the auspices of Great Britain and France. The British voyages were those of Captain James Cook in 1776–80 and Captain George Vancouver in 1790–95. The French voyages were those of Captain J. F. G. de la Pérouse in 1785–88 and Captain Étiènne Marchand in 1790–92.

EIGHTEENTH-CENTURY ANTHROPOLOGY

A picture from the report of the French expedition led by Captain J. F. G. de la Pérouse in 1785-88. It shows French scientists at work with Polynesians on Easter Island, where the expedition stopped en route to the northwest coast of America where further studies were made.

The instructions from their respective governments to the captains of these exploratory voyages contained directives to study the natural history of the regions visited. Natural history in these directives included what is now called ethnography, ethnology, applied anthropology, and physical anthropology. In the instructions to La Pérouse, physical anthropology is included under anatomy and physiology, which in turn are included in the "art of physic." The following section on physical anthropology is quoted from the journal of the voyage of La Pérouse (La Pérouse, 1799, I, pp. 136–139), a copy of which is in the Museum Library. It indicates the interests, methods, and problems of the "physical anthropologists"—the practitioners of the "art of physic"—of the late 18th century.

QUESTIONS PROPOSED BY THE SOCIETY OF MEDICINE to the navigators accompanying Mr. De La Perouse, read at the meeting of the 31st of May, 1785.

EVERY thing that concerns natural philosophy and natural history, that may occur in the voyage about to be undertaken round the world, cannot fail to be interesting to the art of physic, and may contribute to its improvement: but the Society of Medicine conceives, that it ought to confine itself to those subjects, which more particularly concern the art it cultivates. As the questions it has to propose are somewhat numerous, it will arrange them under heads, forming so many divisions belonging to the different branches of the medical art.

SECTION I

Anatomy, Physiology

The Structure of the Human Body, and the Functions of its Parts.

MOST travellers have written on the general structure and form of body of the people they have met with in different countries: but it is well known, that their descriptions commonly abound with mistakes and exaggeration. There is every reason to expect more accuracy from the men of science who accompany Mr. de la Perouse, and they are requested particularly to notice the following points.

1. The ordinary structure of men and women; the long and short diameters of the head; the length of the superior and inferior extremities, measured from the articulation at the shoulder to the end of the middle finger, and from the head of the thigh to the end of the great or of the second toe; the circumference of the pelvis, the width of the chest, and that of the shoulders; the height of the spine, measured from the top of the first of the cervical vertebrae to the sacrum. These proportions are taken from the divisions of painters.

2. The texture and colour of the skin, in general and in different parts; and of the hair and nails.

3. The particular make of the head, or of the cranium; that of the face, and especially of the forehead, nose, eyes, ears, mouth, chin, teeth, tongue, hair, and beard.

4. These different parts islanders are accustomed to disfigure by holes, incisions, and extraneous substances which they introduce into them, as well as by oils, and colours prepared from ochres or vegetable juices.

It may be of use to describe with accuracy the processes employed by the savages for making indelible marks on the skin; the substances they use for this purpose; how they prepare and apply them; the age or circumstances under which the operation is performed; and particularly the local alterations or deformities, or effects upon the individual, which result from it.

5. Excesses, defects, or varieties in the conformation of parts of the body; as the flattening or elongation of the forehead, the contraction or spread of the nose, the enlargement of the mouth and ears. Are these varieties the regular consequences of natural organization, or the effects of particular practices? Dampier says, that two teeth are wanting in the natives of Van Diemen's Land: is it from nature, or are they extracted: Thus the two mouths observed by Cook's sailors in the inhabitants of the American coast, near Prince William's Sound, are produced by a transverse incision made through the lower lip. . . .

Scarcely any thing has been said on the use of the two hands. The question respecting ambidextrous persons, or the preference of one hand to the other, has not yet sufficiently engaged the attention of naturalists: it is of importance therefore to inquire, whether the people, which our navigators may visit, employ both hands equally in their labours, or use one in preference; and whether the predilection in favour of the right, among polished nations, be any thing more than the effect of prejudice. It is of importance also to inquire, whether, among those people who are accustomed to go barefoot, there be any who use their feet as readily as their hands, and for the same purposes.

6. We have no positive information respecting the comparative strength of different men. It would be well to make trial of the burdens, which the inhabitants of countries, where nature has not been debilitated by effeminancy and the customs adopted in polished nations, are able to carry, and of the ground they can pass over in a given time, both walking and running.

7. The nature of the sense of sight,

hearing, and smell, is capable of furnishing important facts respecting the strength or weakness of their organs. Much has been said of the acuteness of smell among savages: it would be interesting to verify this, and to examine whether this acuteness of smell do not exist to the detriment of some other sense . . .

8. The voice, and the greater or less distinctness of articulation, are of importance to be examined, as well as the expression of pleasure, pain, and joy.

9. The age of puberty in males and females. . . . How do the women conduct themselves during pregnancy? . . . Do they swaddle their infants, or what methods do they employ instead of swaddling? Are any practices adopted with regard to children as soon as born, as moulding their heads, or washing them? Do the mothers suckle them? And to what age? Are more boys born than girls?

10. How many children die from the time of birth to the age of puberty? What is the term of life in different climates?

11. The quickness or slowness of the pulse, compared with that of Europeans, which is about sixty-five or seventy pulsations in a minute.

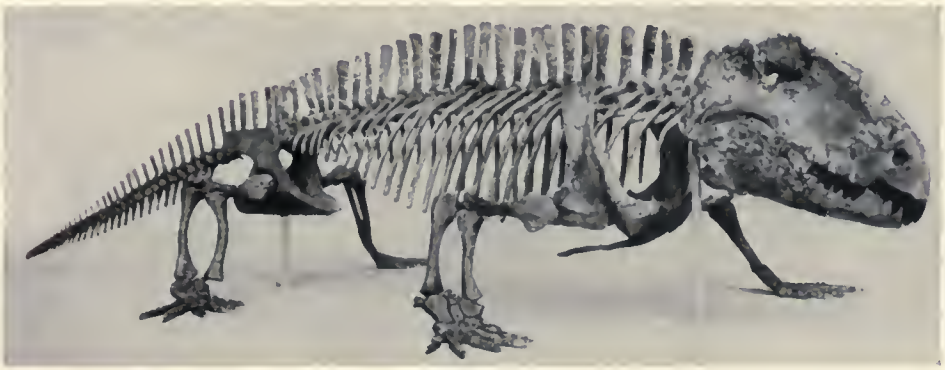
12. The relation of the colour of the skin to that of the fluids. In men of more or less swarthy complexions, has the colour of the spermatic fluid, the medullary substance of the brain, and the blood, any analogy to that of the skin? Among those who are black is there any variation of colour found in individuals, such as pale or white negroes, &c.? Is this variation the consequence of disease, or of a constitution altered by the influence of climate, as is supposed of negroes transported into cold countries? . . .

We take no notice of giants, or pigmies, or men with tails, and the like, because these pretended freaks of nature have never been seen, except by ignorant or prejudiced travellers, or existed only in their heated imaginations.

CORRECTION

In the January issue of the BULLETIN (vol. 22, no. 1, page 4) a picture of *Sphenacodon ferox* from the Early Permian of North America was printed by mistake instead of the picture showing the skeleton of *Bradysaurus baini* from the Karroo Formation of South Africa, for which the caption was written. Both specimens are illustrated below.

BRADYSAURUS BAINI
Karroo Formation, South Africa



SPENACODON FEROX
Abo Formation, North America

FEBRUARY LECTURE TOURS, DAILY EXCEPT SUNDAY

Tours of exhibits, under the guidance of staff lecturers, are conducted every afternoon at 2 o'clock, except Sundays and certain holidays. On Mondays, Tuesdays, Thursdays, and Saturdays, general tours are given covering all departments. Special subjects are offered on Wednesdays and Fridays. A schedule of these follows:

Fri., Feb. 2—One Man's Meat: Unusual Food Animals. Illustrated introduction in Meeting Room (*Harriet Smith*).

Wed., Feb. 7—Prehistoric Forests (*Miriam Wood*).

Fri., Feb. 9—Life in the Polar Regions. Illustrated introduction in Meeting Room (*Lorain Farmer*).

Wed., Feb. 14—Say It with Flowers: Valetine's Day (*Marie Svoboda*).

Fri., Feb. 16—Houses that Minerals Built. Illustrated introduction in Meeting Room (*Anne Stromquist*).

Wed., Feb. 21—Primitive Glamour (*June Buchwald*).

Fri., Feb. 23—Caribbean Contributions: Plants from Middle America. Illustrated introduction in Meeting Room (*Miriam Wood*).

Wed., Feb. 28—Life in the Water (*Jane Sharpe*).

Persons wishing to participate should apply at North Entrance. Tours are free.

NEW MEMBERS

The following persons became Museum Members between December 18 and January 15:

Non-Resident Life Members

Edward Andrew

Associate Members

Waldo Morgan Allen, Edward M. Cummings, Miss Ellen Dunlap Smith.

Sustaining Members

Joseph Targes

Annual Members

Alfred S. Alschuler, Jr., Kenneth H. Anderson, Frederick Asher, T. J. Beirne, Russell O. Bennett, Edwin A. Bergman, Hugh Davis, John I. Duffy, Alec K. Gianaras, Miss Mildred L. Hannaford, Miss Mae F. Mardorf, William V. McKinzie, James Moran, Linton G. Moustakis, Robert L. Noble, J. Vincent O'Neill, Albert W. Potts, S. E. Toussaint, David B. Wallerstein, Mrs. Adele Willott.

Both No 26 (Jackson Boulevard) and "Red Top" (Soldier Field parking area) busses now provide service direct to the Museum, with transfers from and to all other Motor Coach Lines as well as CTA surface lines, elevated, and subway.

Books

(All books reviewed in the BULLETIN *are available in The Book Shop of the Museum. Mail orders accompanied by remittance are promptly filled—The Book Shop pays the postage on shipments.)*

HANDBOOK OF ATTRACTING BIRDS. By Thomas P. McElroy, Jr. Illustrated by Lambert Guenther. Alfred A. Knopf, New York, 1950. xi+163 pages, 51 text figures. Price $3.

Whether or not birds live in your garden or fields depends on whether or not food, water, and cover for living and for nesting are available to them. This volume by McElroy sets forth how one can attract birds and gives directions for making feeding stations, bird baths, and nest boxes, as well as for planting food plants. But it goes far beyond this. It relates the birds and their needs to land use and conservation generally. Attracting birds is briefly covered, from window boxes and landscaped gardens for song birds to farms, ponds, and wastelands for game birds. Trees, shrubs, and pond plants are listed with their attractions.

A chapter on predation asks for an intelligent appraisal of hawks and owls. They have a proper place in the scheme of things. Even the cat is not wholly condemned. It is pointed out that predation, along with other factors such as climate and disease, must eliminate many young birds each year or we would be inundated with birds and they would starve. However, at such places as feeding stations, where high populations of birds are artificially maintained, it obviously becomes necessary to eliminate the predator that is trying to eat the birds you want to watch.

The very good advice is given to well-meaning people who would like to bring a chirping fledgling into the house and personally care for it to leave its care to its own parents. However, orphaned youngsters may need to be raised, and directions are given for this. Sick birds, McElroy rightly says, should be returned to a protective cover (if not painlessly eliminated) in the hope that nature will aid recovery. Directions are given for treating broken wings, but I wonder if broken-winged birds should not rather be treated like sick birds. Brief sections treat bird study, bird banding, and sanctuaries as community efforts in nature study.

The approach used, relating birds to their environment, and the lack of sentimentality are refreshing in a book of this sort. The sections on bird baths, houses, feeding stations, and garden planting are detailed enough to be practical. The other sections are hurried surveys of a series of subjects: glimpses and indication of what one would find if there were time to stop and explore more fully these avenues. But a volume of only 163 pages, which includes 51 illustrations, has to hurry to cover so many and such complicated aspects of bird life. In line with this, when any extensive planting or game management project is proposed, one is advised to get in touch with one's county agent or other government official who can give advice based on his own local experience.

A two-page bibliography is given. Lists of selected references and background reading for the subject of each chapter would have been more useful, however, and a more effective aid to those who will want to explore the vistas so attractively sketched.

AUSTIN L. RAND
Curator of Birds

THE MEANING OF EVOLUTION, A Study of the History of Life and Its Significance for Man. By George Gaylord Simpson. Yale University Press, 1949. xv+364 pages, 38 text figures. Price $3.75.

In this important and timely book one of the most eminent of living paleontologists presents an authoritative summary of the vast accumulation of information from fossils that forms the basic factual record of the evolution of life on earth. This record exhibits two main types of evolution: the progressive (under various meanings of the word) and the radiating, which last produces the vast variety of forms of life, accounts mainly for the "origin of species," and makes it necessary for the layman to add to his meanings for the word "radiation" the evolutionary one of adaptive differentiation in varied environments.

The second part of the book gives an exposition of the modern biological interpretation not only of the paleontological record but of current thought in those life sciences that are of major importance to an understanding of evolution. This refers especially to the completely modern phase of the study of heredity marked by return to an active interest, from the base of its own data, in evolutionary problems. These two parts of *The Meaning of Evolution* form an abbreviation and popularization of Dr. Simpson's more technical work, *Tempo and Mode in Evolution*. The more popular work thus meets a conspicuous need in the intellectual life of our times, namely the summarization and interpretation of the technical literature of science for the intelligent layman *by the scientists themselves*.

Among the more important of the corrections of widely held popular misconceptions about evolution and its method is the clear statement of the new understanding of the principal effective operating forces in evolution, subsumed under the term "natural selection." Paleontologists, ecologists, and geneticists alike have come to reject the "tooth and claw" interpretation of the struggle for existence. A gladiatorial theory of existence (the phrase is that of Thomas H. Huxley) was made current by the followers and disciples of Darwin in the latter part of the 19th century. When applied to human relations this concept of evolution afforded the basis for the monstrous belief in human war as inevitable and natural and thus in itself good. This view, now seen to be essentially false, has been a factor in bringing about much of the calamitous destruction of the civilized world and its resources in the first half of the 20th century.

Much better than his over-hasty interpreters, Darwin understood that there is selection for the ability to co-operate as well as for the capacity for overt struggle. Overt struggle, in its turn, has been shown to be far less effective than the slow transformation of populations by the differential selection of hereditary characters, and this is now regarded as the most important clue to the methods of evolutionary change.

From the standpoint of a strict mechanist, Dr. Simpson subjects a group of recent philosophic interpretations of evolution to sharp critique. The works in question, exemplified by du Noüy's *Human Destiny*, invoke vitalism or finalism, or both, as essential to the explanation of adaptation and, further, as essential to a reconciliation of religion and science. Their several authors appear, however, to be quite unaware of modern evolution—any studies in the field of heredity or, for that matter, of the factual record of paleontology.

When Dr. Simpson turns to the further interpretation of the meaning of evolution to ourselves, he comes to grips with the false antithesis between religion and science that has become a source of weakness in the societies of civilized man. We plainly need as much as did our forebears in an unscientific age the inward strengthening and stabilization that is rooted in our religious feelings and instincts. Because the importance of science in the modern world cannot be denied, whereas its conclusions seem to many earnest persons to be at variance with religious beliefs, the importance of religion itself and of the associated ethical systems has been allowed to decline. I believe, as Dr. Simpson evidently does, that it is the duty of every man or woman to examine his own attitudes and beliefs and to achieve a working personal religion of his own. In this final part of *The Meaning of Evolution* the reader will find much clarification of the "Search for an Ethic." I join Dr. Simpson, across a considerable divergence of philosophic background, in the profound belief that it is only the truth that can make us free.

KARL P. SCHMIDT
Chief Curator of Zoology

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Members are requested to inform the Museum promptly of changes of address.

A LILY IS 'QUEEN'

BY EMIL SELLA

CURATOR OF EXHIBITS IN BOTANY

Nearly 130 years ago Dr. Nathaniel Wallich, the great Indian botanist, in a monograph of the genus Hedychium described this ginger lily as follows: "This is

HEDYCHIUM GARDNERIANUM

This model of a lily of the Ginger family is a recent addition to the plant exhibits in Hall 29.

the queen of the genus, surely there exists not even an Orchidea which exceeds it in any respects."

This recent addition to the plant exhibits in Martin A. and Carrie Ryerson Hall (Plant Life—Hall 29) is known as Hedychium Gardnerianum. The plant is a native of the temperate regions of the Himalayas. Dr. Wallich first discovered it in Nepal, India, and named it in honor of Edward Gardner, an official of the East India Company and one of the pioneers in Indian botany.

Propagated by division of the rhizomes, this plant develops annual growths of five to seven feet in height. Its stems, with canna-like leaves, bear large terminal flower spikes one foot or more in length. The fragrant blossoms are golden yellow with a long projecting red filament. Attractive as the flowers may seem, the late fruiting period can be equally striking. Each fruit, splitting into three orange-yellow segments, reveals seeds of brilliant crimson. This display, along with the green of the bracts and leaves, results in a colorful array that often remains unfaded for several weeks.

The living material required for this model was obtained through the co-operation of the Garfield Park Conservatory, Chicago. It was later reproduced by the writer with the aid of Frank Boryca and Samuel H. Grove, Jr., Assistants in Plant Reproduction.

STAFF NOTES

Dr. Sharat K. Roy, Chief Curator of Geology, flew to El Salvador in the latter part of February to begin his expedition. He will spend several months in geological and paleontological field investigations and in research at the laboratories of the Instituto Tropical de Investigaciones Cientificas, Universidad Autonoma de El Salvador, which is jointly sponsoring the project with Chicago Natural History Museum. **Dr. Austin L. Rand,** Curator of Birds, left February 14 to participate in this enterprise for the Department of Zoology. The Department of Botany has been represented since last year.... **Loren P. Woods,** Curator of Fishes, left February 12 to take part in dredging operations in the Gulf of Mexico on the United States Fish and Wildlife research vessel *Oregon*.... **D. Dwight Davis,** Curator of Vertebrate Anatomy, lectured on the animal life of Borneo to the Northwestern University seminar in zoology on February 9.... **Leon R. Aboulafia,** visiting fellow from the Biological Institute of Tel-Aviv, lectured on "Biotopes and Animal Life of Palestine" to the Ecology Group at the University of Chicago on February 5.... **Dr. Julian A. Steyermark,** Curator of the Herbarium, lectured on a variety of botanical subjects recently before the Biltmore Garden Club, Barrington Natural History Society, Ravinia Garden Club, and Wauconda Parent-Teachers Association.... **Dr. Alexander Spoehr,** Curator of Oceanic Ethnology, lectured recently to students in the Department of Anthropology of Northwestern University on "Field Methods in Ethnology."... **Donald Collier,** Curator of South American Ethnology and Archaeology, participated in a recent meeting of the Carbon-14 Committee of the Institute for Nuclear Studies at the University of Chicago.... **Miss Elaine Bluhm,** Assistant in Archaeology, lectured on "Archaeology as a Career" in the Career-Day program of the Lyons Township High School, La Grange, Illinois.

THIS MONTH'S COVER

"Flight" is the title of the picture on the cover. This unusual photograph of a flock of gulls, ranged almost like an Army Air Force formation, was awarded an honorable mention in the Sixth Chicago International Nature Photography Exhibition held at the Museum during February under the joint sponsorship of the Museum and the Nature Camera Club. The photographer is Louis Quitt of Buffalo, New York.

Visiting Hours Change March 1

Beginning March 1, spring visiting hours, 9 A.M. to 5 P.M., will replace the winter schedule of 9 to 4. The new hours will continue in effect until April 30.

NEW MEMBERS

The following persons became Museum Members between January 16 and February 15:

Contributors

Mrs. Susie I. Grier,* Dr. R. H. Whitfield

Non-Resident Life Members

Dr. T. George Allen

Associate Members

Louis R. Howson, Arnold H. Maremont

Annual Members

Arthur C. Allyn, Lucius A. Andrew, Jr., Sidney L. Barber, Mark L. Baxter, Lloyd W. Bowers, William A. H. Brackett, J. Beidler Camp, John M. Connery, Edmund B. Coon, Johnson S. Davis, Keith J. Evans, Mrs. Evelyn Fries, John H. Golden, Carlton Hill, E. M. Holt, Mrs. John F. Hutson, W. J. Jack, Miss Lillian K. Jaech, Allen M. James, Thomas C. Jones, Waino M. Kolehmainen, Edward J. Lewis, Cecil E. Magid, H. M. Matson, F. Chaloner McNair, Dr. Eugene Mittelmann, C. H. Mottier, G. C. Pound, Miss Nancy P. Robertson, Clair M. Roddewig, Dr. Arthur A. Rodriguez, Lee Schooler, Paul E. Sieber, Miss Ruth I. Sklower.

* Deceased

THE REPTILES AND AMPHIBIANS OF THE CHICAGO REGION

By CLIFFORD H. POPE
CURATOR OF AMPHIBIANS AND REPTILES

IT IS an open question whether the average visitor in a museum would rather see something familiar or something unusual. Will a raccoon or an okapi arouse the greater interest? Whatever the answer to this provocative question may be, the exhibit most recently placed on display in Albert W. Harris Hall (Hall 18—reptile and amphibian section) is based on the conviction that the familiar commands at least as much interest as does the unusual.

The new exhibit consists of the herpetological fauna of the Chicago area and, in its three cases, one sees all the kinds of lizards, snakes, frogs (including toads), and salamanders that are found within some seventy miles of the Loop (the local turtles will be put on display later). The aim of the exhibit is to show exactly what species of amphibians and reptiles might be encountered during a day's outing in the Chicago area. Obviously this exhibit will be used in two ways: from it some will learn how to avoid these animals, others where to find them. It is hoped that at least a few of those who come to learn how to avoid will go away wanting to find. This turning of a stumbling-block into a stepping-stone is called educating, and the Museum is an educational institution.

PLASTICIZING NATURE

Assistant Taxidermist Ronald J. Lambert is shown saturating a bit of woodland soil with lacquer solution. The lacquer, when dry, will invisibly hold together this segment of the "actual outdoors" so that it may be taken up and used as part of a Museum exhibit. The close-up in the lower picture shows how the selected ground work has been fitted to the model of a bull snake that will be exhibited upon it.

There are several interesting things about the structure of the new exhibits. It may come as a surprise to some that no actual part of reptile or amphibian is to be seen in the three cases. All the specimens are reproduced in a plastic material by the special method invented and developed in Chicago Natural History Museum by Taxidermist Leon L. Walters and executed by Walters and Assistant Taxidermist Ronald J. Lambert. The process is laborious but the results are superb.

Taxidermist Walters first makes a plaster mold of the freshly killed animal. After taking the body out of the mold he paints inside the mold, using liquid plastic colored to match the specimen. One animal may have as many as fifteen or even twenty colors that will call for as many mixtures. By correlating the individual scales of a reptile with the scale impressions in the mold, Walters or Lambert can copy the pattern with great accuracy. In salamanders and frogs the scales are lacking but the patterns can be copied by using other guide marks.

After a sufficient thickness of plastic has been applied to the inside of the mold, plaster and plastic are separated and the thin cast is strengthened by the application of a filler of one of many sufficiently strong materials. When the plaster has been thoroughly removed, the surface of the plastic shines exactly like that of a reptile or amphibian. Painted plaster, wax, or tanned skin simply do not have this natural appearance. It is virtually impossible for the layman to tell a live reptile from a plastic one, and even the student is fooled. The plastic specimens are so tough that they can be bounced on the floor without being badly damaged. Their durability is great and they do not burn readily.

Every animal in the Chicago exhibit rests on a segment of its natural habitat or home. Recalling how well the animals themselves are reproduced, some visitors might jump to the conclusion that these attractive little segments of the outdoors are also artificial. Certainly, it could be reasoned, anyone who could make a plastic snake could easily fashion a base of artificial soil, stones, leaves, and grass. However, in this instance the ingenuity of Taxidermist Walters has worked out a far simpler and more effective setting for his deceptively real specimens. His method is thoroughly to saturate a small segment of suitable ground or woodland with lacquer solution, lift it up after it has dried, bring it into the Museum, and reinforce it with plaster or other suitable material. Thus a vast amount of time is saved and a perfect background achieved with little effort. On a single trip into the country a whole series of bases can be brought back and kept for future use.

Finally, it should be noted that the Chicago cases have a new style of background and lettering, and include color photographs by Assistant Taxidermist Lambert of the home sites of many of the species displayed. The background of a case may be of more than one color, and the labels, instead of being printed on pieces of paper as heretofore, are composed by hand of raised letters of different attractive hues. The total effect is colorful and varied rather than drab and uniform. Several maps, painted in an original manner by Miss Margaret G. Bradbury, Artist for Zoology, lend their own artistic touch and add interesting information. In the central case the patterns of distribution of the local reptiles and amphibians are explained by a series of maps.

The ranges of these fall into the six major types or patterns illustrated. Chicago lies near the edge of most of these ranges: many prairie species are not found east of our area and many eastern woodland or

highland species do not occur farther to the west. Chicago is not merely a railroad terminus. The richness of its animal life is due to its position between the central prairie and the eastern highlands and forests. Few flat regions of its latitude are endowed with such rich animal life.

A map that should prove interesting to many is the little one showing the local range of Chicago's only poisonous snake, which is also the area's most dangerous

COMMON WATER SNAKE

An example of the amazing plastic reproductions made by Staff Taxidermist Leon L. Walters.

animal. This little rattlesnake goes under its Indian name massasauga. Millions of people live and die here without ever seeing one of these reptiles, and yet the map shows no fewer than five places where it does live, often in abundance. Deaths from its bite are unheard of. A small barefoot child would be its only likely victim.

LOCAL FAUNA IS RICH

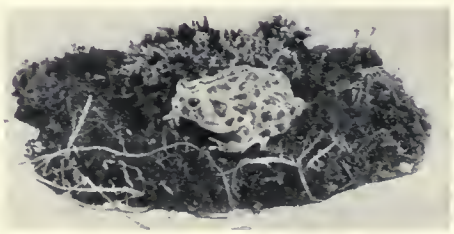
History shows that Chicagoans are very proud of their city. Nevertheless, it is not likely that any of the great boosters such as John Stephen Wright or "Deacon" Bross ever included the rich herpetological fauna as a valuable asset or even realized that the Chicago area surpasses many other northern urban areas in number of species, among them the London, Berlin, and Peking areas. However, upon the arrival of a New Yorker (it must be painfully admitted) the local booster would have to sidestep the subject because New York is located in a region of exceptional richness that harbors sixty-four species, or twelve more than Chicago.

If a Londoner comes to town the subject should be brought up at once. The region of London can boast of a mere dozen unless one chooses to add the few kinds of sea turtles that are occasionally stranded on the coast. The New York list of sixty-four includes two of these, whereas such marine creatures are of course unknown in Chicago except when they arrive on ice.

London suffers the disadvantage of being on an island that was completely depopulated of cold-blooded, back-boned animals by the low temperatures of the last Ice Age. When the frozen waters were piled on the continents, the level of the seas was lowered and the British Isles became part of the mainland. As the glaciers retreated northward the mainland cold-blooded animals re-invaded the British peninsula, but the invasion was cut short by the flooding of the lowest areas and by the subsequent formation of the isolating channels such as the English Channel. Ireland was isolated after but two amphibians and one reptile (a lizard) had reached it. England was a little more fortunate. It was snake worship, not real snakes, that St. Patrick drove from Ireland. The fact that the inhabitants of Ireland worshipped a form of life that did not exist on their island shows that they, too, were relatively recent arrivals. To be specific, England was separated from the mainland between 8,000 and 9,000 years ago.

Farther west is the Berlin region where some twenty-two kinds of reptiles and amphibians occur. Berlin and London are of course much farther north than are New York and Chicago, but London enjoys a milder climate and might be expected to have more cold-blooded animals; its disadvantage has already been dealt with. Halfway around the world from Chicago lies the Peking region with merely nine species. This paucity is partly due to the relatively dry conditions that prevail in northeastern China.

In *Amphibians and Reptiles of the Chicago Area*, published by the Museum, one may find a detailed account of all local reptiles and amphibians. This book is richly illustrated with reproductions of excellent drawings, photographs, and paintings representing forty-nine of the fifty-two species treated. Five of the twelve plates are in color. The text is not technical.



FOWLER'S TOAD

One of the many specimens on exhibition, reproduced by Staff Taxidermist Leon L. Walters' plastic technique.

Man

When Nature, her great masterpiece design'd
And fram'd her last, best work, the human mind,
Her eye intent on all the wondrous plan,
She form'd of various stuff, the various Man.

—BURNS

SATURDAY LECTURE COURSE BEGINS THIS MONTH

With a range of subjects from Alaska to South America, Mexico to Australia, and Wyoming to Africa and Fiji, the Museum will present its annual Spring Course of free illustrated lectures on travel and science beginning this month. There will be free lectures and color films on each Saturday afternoon throughout March and April. They will be given in the James Simpson Theatre of the Museum and all will begin at 2:30 P.M.

Limited accommodations make it necessary to restrict these lectures to adults. Members of the Museum are entitled to reserved seats on application. For children, free motion pictures will be presented on the mornings of the same Saturdays by the Raymond Foundation.

Following are the dates, subjects, and lecturers:

March 3—ALLURING ALASKA
Both the familiar and the unusual
Frederick Machetanz

March 10—FIJI
Cannibal islands of yesterday
Herbert Knapp

March 17—PASSPORT TO SAFARILAND
Rare pictures of big game in Africa
Berry B. Brooks

March 24—INTO CENTRAL AUSTRALIA
Record of a naturalist's travels
Alfred M. Bailey

March 31—THE MOUNTAIN
Ascent of Grand Teton in Wyoming
Ray Garner

April 7—VENEZUELA VENTURE
A trip to the world's highest waterfall
Nicol Smith

April 14—EARLY AMERICAN INDIANS
1950 archaeological work of the Museum
Paul S. Martin

April 21—ANCIENT AND MODERN MEXICO
A biologist tours a popular vacation land
Harry J. Fuller

April 28—THROUGH THESE DOORS
A glimpse of this Museum's activities
John R. Millar

No tickets are necessary for admission to these lectures. A section of the Theatre is reserved for Members of the Museum, each of whom is entitled to two reserved seats. Requests for these seats should be made in advance by telephone (WAbash 2-9410) or in writing, and seats will be held in the Member's name until 2:25 o'clock on the lecture day.

PRIZE WINNERS IN 6th NATURE PHOTO CONTEST ANNOUNCED

The Sixth Chicago International Nature Photography Exhibition, sponsored jointly by Chicago Natural History Museum and the Nature Camera Club of Chicago, which was held during February in Stanley Field Hall of the Museum, was the most successful since these shows began.

In the 1951 show there were displayed more than 200 large-size prints and more than 700 color slides, submitted by both amateur and professional photographers in all parts of the United States and foreign countries as well. The accepted pictures were selected from a total of approximately 2,800 pictures. Public projections of accepted color slides in the James Simpson Theatre on February 11 and 18 were attended by more than 1,100 persons.

'LAND'S END'

By Edmund W. Raab, of Los Angeles. Awarded an honorable mention in the Nature Photography Exhibition.

The exhibition was in two divisions, prints and color slides, with three classifications in each division: animal life, plant life, and general. The first-prize winner in each classification has been awarded a silver medal, and ribbons for honorable mention were awarded to other entries in each classification. Names of the prize winners will receive subscriptions to the BULLETIN of the Museum and other rewards.

The increasing success of these annual photographic events is due in a large measure to the efficient work of members of the Nature Camera Club of Chicago, to H. G. Mitchell, its president, and especially to its exhibition committee, of which H. J. Johnson is chairman.

Following are lists of medal winners and awards of honorable mention:

MEDAL WINNERS

Black-and-White Photographs:

ANIMAL LIFE SECTION: David M. Stanley, Mesa, Ariz.—*Angry Tern.*

PLANT LIFE SECTION: Dr. Eliot F. Porter, Santa Fe, N.M.—*Agave Lecheguilla.*

GENERAL SECTION: Otto Litzel, New York City—*Mud Pattern.*

Color Slides:

ANIMAL LIFE SECTION: Jack Brennan, Salt Lake City—*Arizona Mule Deer.*

PLANT LIFE SECTION: G. F. Johnson, State College, Pa.—*Roots of Ice.*

GENERAL SECTION: Pearl E. Schwartz, Chicago—*Afterglow.*

HONORABLE MENTIONS

Black-and-White Photographs:

ANIMAL LIFE SECTION: Mike Bishop, New York City; H. Lou Gibson, Rochester, N.Y.; W. T. Loke, Singapore, Malaya; Louis Quitt, Buffalo; Dr. Eliot F. Porter, Santa Fe, N.M.; Harry R. Reich, North Tonawanda, N.Y.; Dr. G. B. White, Port Colborne, Ontario, Canada.

PLANT LIFE SECTION: James C. Gilchrist, Landover, Perthshire, Scotland; H. J. Ensenberger, Bloomington, Ill.; Dr. Grant M. Haist, Rochester, N.Y.; W. A. Kirkpatrick, Phoenix, Ariz.; Thomas J. Newett, Park Ridge, Ill.; Dr. Eliot F. Porter, Santa Fe, N.M.; Reinhart Wolf, Crawfordsville, Ind.

GENERAL SECTION: H. M. Bates, Worcester, Mass.; Eric L. Bertena, Santiago, Chile; Mike Bishop, New York City; Blanche Kolarik, Chicago; William G. McClanahan, Lake Charles, La.; Edmund W. Raab, Los Angeles, Calif.

Color Slides:

ANIMAL LIFE SECTION: Don Bleitz, Hollywood, Calif.; Edward A. Hill, Fleetwood, Pa.; J. W. Markey, Eaton, Ohio; Mrs. Ethel P. Owen, Riverside, Ill.; Alfred Renfro, Santa Barbara, Calif.; Perry J. Reynolds, Detroit, Mich.; Cyril F. Smith, Dartmouth, Nova Scotia, Canada; Bertha Townsend, Johnstown, Pa.; Mrs. Charles Walgreen, Chicago.

PLANT LIFE SECTION: Mrs. Irene R. Ayres, Los Angeles; Ladislaus Cutak, St. Louis; Mrs. M. Johnson Fuller, Riverside, Ill.; Winifred G. Glover, Oakland, Calif.; H. W. Greenhood, Hollywood, Calif.; James L. Kirkland, Chicago; Blanche Kolarik, Chicago; H. G. Mitchell, Chicago; George W. Purdy, Port Orchard, Wash.; Perry J. Reynolds, Detroit, Mich.; Arthur J. Scott, Waltham, Mass.; Walter Singer, New York City; Cyril F. Smith, Dartmouth, Nova Scotia, Canada; A. Stewart, Santa Barbara, Calif.; R. H. Souers, Chicago; Bertha Townsend, Johnstown, Pa.; Lewis A. Trapp, Toronto, Ontario, Canada; N. E. Weber, Bowmansville, Pa.

GENERAL SECTION: Mrs. Irene R. Ayres, Los Angeles; Rev. H. Bielenberg, Oil City, Pa.; Jack Brennan, Salt Lake City; Byron S. Crader, Glendale, Calif.; Don Ferguson, Salt Lake City; Joseph B. Gill, Salt Lake City; Earl E. Harris, Montebello, Calif.; G. Lewis Johnson, Winthrop, Maine; Russel Kriete, Chicago; Angel de Moya, Havana, Cuba; J. A. Pasco, Elmhurst, Ill.; Ben Randall, Orinda, Calif.; Mattie C. Sanford, Salt Lake City; Ethel Schroeder, Chicago; Hy Seldidge, Honolulu, Hawaii; C. E. Swink, Villa Park, Ill.; Ruth Welty, Chicago; Dr. C. C. Wendle, Sandpoint, Idaho; Adolf Vignale, New Toronto, Ontario, Canada.

'WHITE-BELLIED SEA EAGLE'

By W. T. Loke, of Singapore, Malaya. One of the pictures in the Nature Photography Exhibition.

The Photographic Society of America awarded two special medals for complementary or adjacent colors. These awards were made to R. H. Souers, of Chicago, for *Water-Lily*, and John H. Stanley, of Columbus, Ohio, for *Last One In—Starves!*

The judges were Conrad Emanuelson, photographer; John W. Moyer, in charge of the Museum's Division of Motion Pictures; R. Marlin Perkins, Director of Lincoln Park Zoo; Merrill Tilden, photographer; and Rainer Zangerl, Curator of Fossil Reptiles at the Museum. An illustrated catalogue of the exhibit, available early in March, will be published by the Nature Camera Club.

'FAMILY GROUP'

By Dr. Grant M. Haist, of Rochester, N.Y. Awarded an honorable mention in the Nature Photography Exhibition.

El Salvador Bird Project

A handbook on the birds of El Salvador is one of the important projects of the Division of Birds for 1951. This work, part of the project in which the Museum is co-operating with the State University of El Salvador, is being undertaken by Melvin A. Traylor, Jr., Research Associate in Birds, who is preparing the descriptions and keys from specimens in the Museum, and Dr. Austin L. Rand, Curator of Birds, who left in February to spend six months in El Salvador studying the birds there and writing the remainder of the text.

The photographic files of the Museum contain more than 100,000 negatives of material in the exhibits and study collections and of field work all over the world.

THE 'POND SCUMS' ARE ALGAE; THEY HELP KEEP FISHES ALIVE

By HANFORD TIFFANY
RESEARCH ASSOCIATE IN CRYPTOGAMIC BOTANY*

Nearly everyone has noticed green growths in pools, ponds, ditches, and lakes as well as on soil, along shore, and in aquaria. Many of these growths are algae, often inelegantly referred to as pond scums. The angler is not likely to think of the algae when pursuing his favorite sport, but well he might. The algae are the primary food-makers of the water, just as other green plants perform that necessary process on land; and the fishes directly or indirectly are dependent upon the algae for food: no algae, no fishing.

It is an old adage that there is a place for everything and that everything should be in its place. Perhaps it was from just such vague beginnings that the science of taxonomy arose—the naming and classifying ("putting in their places") of things. Among the algae there are levels of relationships, from individuals to large assemblages of related individuals that have received names and rank. The "top brass" are the phyla, the classes, and the orders, but they will be ignored in this article, and we shall start with the family. Prominent among fresh-water algae is the family, Oedogoniaceae.

This particular family of plants has three members: *Oedogonium*, *Bulbochaete*, and *Oedocladium*. Each of these three has the rank of genus (pl. genera) and is composed of few to many subordinate captains and lieutenants known as species and varieties.

'SWOLLEN FRUITS'

The name *Oedogonium* comes from two Greek words meaning "swollen fruits," referring to the swollen reproductive cells in the filaments. *Bulbochaete* also stems from two Greek words translated "bulbous bristles," in reference to the laterally placed hairs on the vegetative cells. *Oedocladium* is from the Greek too, indicating two features of the plant: branching and swollen reproductive cells. *Oedogonium* is a large genus, composed of some 335 species that differ in size, nature of reproduction, cell-wall markings, and shapes of sexual cells. *Bulbochaete* has about 70 species, with similar bases for delimitation. *Oedocladium* with 10 species is the smallest genus of the three.

Both *Oedogonium* and *Bulbochaete* are widely distributed throughout the world in such fresh-water habitats as permanent and temporary ponds, lakes, and streams. None is marine, although three or four species have been reported from brackish waters. A few grow on damp soil, and vegetative filaments are occasionally found in arctic and alpine areas. *Oedocladium* is comparatively much more restricted in distribution. It was first discovered in Germany some sixty years ago and has not been found there since. It is currently known from India, Puerto Rico, and scattered areas representing the eastern and southeastern United States. Most of its species are terrestrial, associated with other soil algae, moss protonema, and liverworts. The species of *Oedogonium* and of *Bulbochaete* are very common in the Central States area, the prairies, and southeastern United States.

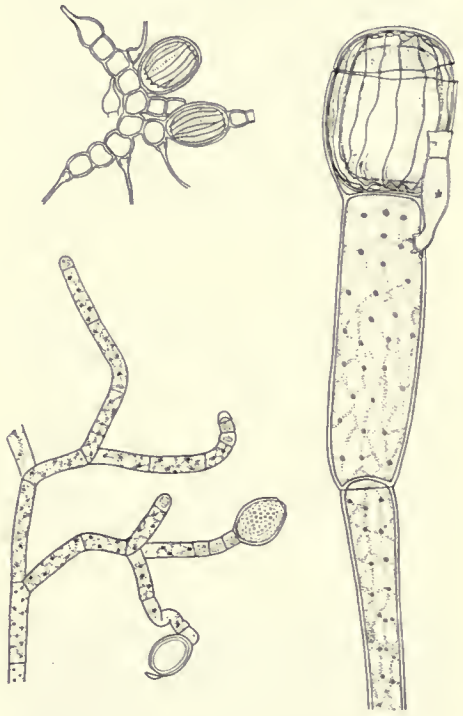


Fig. 1. The three genera of Oedogoniaceae discussed in Dr. Tiffany's article: upper left—Bulbochaete, lower left—Oedocladium, and at right—Oedogonium.

The three genera are easily distinguished one from the other with a hand lens or microscope but are difficult to identify otherwise. They grow attached to various substrates by means of special holdfast cells, although they may be separated from their moorings and live for some time floating in water. The filaments of *Oedogonium* are not branched. Both *Bulbochaete* and *Oedocladium* are branched filaments, but the latter do not have the bulbous hairs so characteristic of *Bulbochaete*.

CELL STRUCTURE

The vegetative cell of the group is more or less cylindric with a rather rigid wall and a net-like chromatophore adjoining the wall. The predominant color in the chromatophore is green, due to the presence of chlorophylls, although yellow and orange pigments are also present. The association of these three pigments is similar to that obtaining in the flowering plants. The cell-wall has been examined chemically and found to contain cellulose, pectic compounds, and small amounts of chitin. When the vegetative cell divides, especially in *Oedogonium*, there remains a terminal portion of the old cell-wall known as an apical cap. The caps appear as transverse rings or lines at the upper end of the cell, and in *Oedogonium* the number of such apical caps corresponds to the number of times the cell has divided.

The Oedogoniaceae has no close relatives, and some features of its reproduction are unique. The contents of a single cell may break through a circular rent in the upper end of the wall, emerge in an amoeboid fashion, and develop into a flagellated cell known as a zoospore. Many flagella occur on each zoospore, forming a ring just back of the anterior end. The zoospore swims around in the water for a half-hour or so, settles upon some substrate, and undergoes cell divisions that result in another plant. Occasionally non-flagellated spores are formed from the vegetative cells. Such reproduction is referred to as asexual.

LIFE CYCLE

Sexual reproduction can scarcely be described without the use of certain terminology, some of which is unique for the Oedogoniaceae. A vegetative cell may increase in size, change its form and shape, and become an oogonium (egg-case), within which a single egg is formed from the protoplasm. The oogonia may occur singly or in series. Other vegetative cells may undergo divisions, resulting in one or more much smaller cells, called antheridia (sperm-cases). The protoplasm of each antheridium may develop into one or two sperms. Oogonia and antheridia may occur in the same filament, or they may occur in separate filaments. Thus some plants may be thought of as male, or sperm-producing; others as female, or egg-producing; while still others are hermaphroditic, bearing both eggs and sperms. Sex organs are mature in about two days after the oogonia and antheridia become differentiated from the vegetative cells.

The emergence of sperms from the antheridia and subsequent fertilization of the egg appear to have a certain rhythmic recurrence. Maximal sexual reproduction has been observed in one species to occur between midnight and 4 A.M. A second lesser emergence of sperms and union with eggs take place between noon and 4 P.M. Some sexual reproduction may occur sporadically throughout the day. Sexual union may take place within a few minutes after

*Dr. Tiffany is William Deering Professor of Botany at Northwestern University. He is author of *Algae, the Grass of Many Waters* and co-author of *Textbook of Botany*.

the escape of the sperm from the antheridium. In appearance the sperm looks like a small zoospore, and its escape from the antheridium follows the same pattern as that in the zoospore, described above. The sperm disintegrates within twenty to thirty minutes if no sexual union occurs. The egg is not motile and remains within the oogonium. In the wall of the oogonia at specific places often characteristic of the species, there develop pores or slits that allow for the entrance of the sperm into the egg-case.

After union of the sperm nucleus and egg nucleus, the egg becomes a zygote, withdrawing somewhat from the oogonial wall and forming a wall of its own. The zygote usually remains dormant for about a year, although it may resume activity earlier or remain dormant for several years. Upon germination of the zygote, the number of chromosomes is halved and usually four zoospores are formed. Upon liberation from the old oogonium, the zoospores after a short period of activity develop into new filaments.

There is an added feature to the sexual reproduction in some of the Oedogoniaceae that occurs nowhere else in the biological world. In some species the small cells formed by divisions of the vegetative cell do not produce sperms. Instead they produce flagellated cells that look like sperms but are physiologically different. When these cells (androspores) are liberated from their spore-cases (androsporangia), they come to rest on or near an oogonium but never enter it. Upon germination of the androspore a miniature sperm-producing plant, called a dwarf male, is produced, remaining epiphytic on the larger filament. Terminal cells of the dwarf male become antheridia, which develop normal sperms. There then may ensue fertilization of the egg in exactly the same manner as noted above.

The androspore upon germination thus produces another filament, although it is small and epiphytic. This would indicate potentialities similar to those of the zoospore. Germination, however, occurs only *near* the egg, thus indicating some attraction to the egg but not sufficient to cause fertilization. Perhaps the androspore may be regarded as a modified sperm that has retained some degree of sexuality: it cannot unite with the egg but can grow if in its immediate vicinity.

These microscopic algae are found in the stomachs of many aquatic animals, including some fishes, and are even eaten by such mammals as cattle and squirrels that chance to be near shores where Oedogoniaceae grow. Algae are mostly annuals, having definite seasons of vegetative development and reproduction, although some species persist through the winter months in the vegetative state. Dormant zygotes, akinetes, and the "resting buds" of *Oedocladium* are the usual structures responsible for survival during non-growing seasons. Zoospores may be formed any time during vegetative activity, and new plants develop in which other zoospores are formed. In this way the number of plants may increase rapidly, and some species form large mats in areas of quiet water.

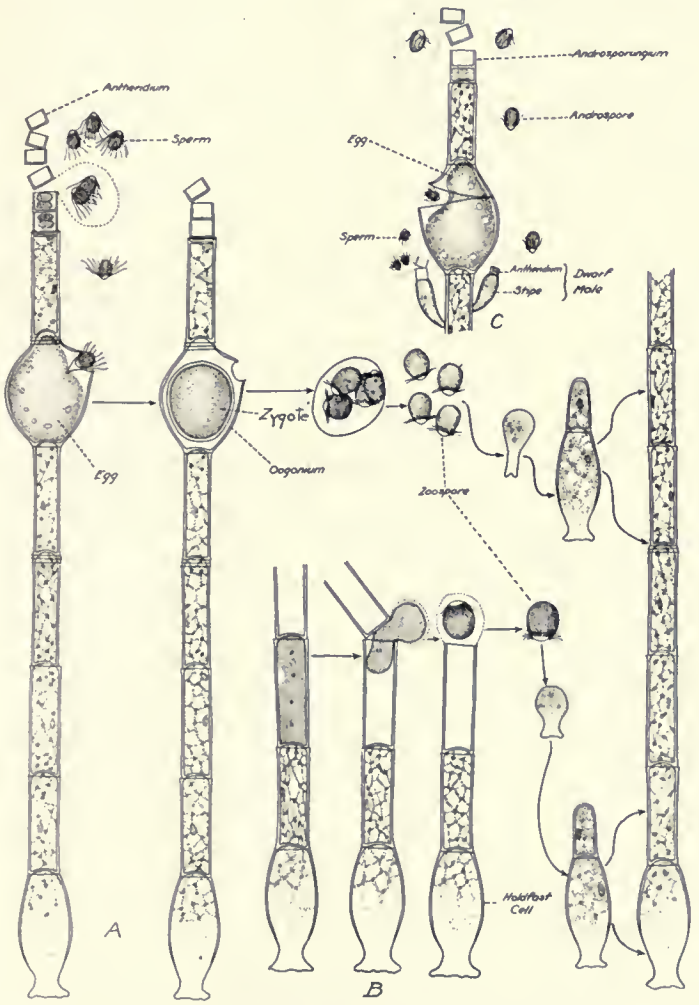


Fig. 2. Life cycle of Oedogonium: A and C, sexual reproduction; B, asexual reproduction (see text for details). Enlarged glass models of these stages may be seen in Martin A. and Carrie Ryerson Hall (Plant Life—Hall 29).

The Oedogoniaceae are green plants that can carry on photosynthesis. They may be considered one of the "crop" plants of aquatic habitats.

NEW LAYMAN LECTURE: 'BEHIND THE SCENES'

After a month's absence for a lecture tour to other cities Paul G. Dallwig, the Layman Lecturer, will resume in March his popular Sunday afternoon appearances at the Museum. "Behind the Scenes in Our Museums" is Mr. Dallwig's subject this month, and he will present this lecture on March 4, 11, 18, and 25. The lectures will begin at 2 P.M. and end at 4:30 P.M. Midway there will be an intermission for tea or other refreshments in the Museum Cafeteria.

The March lecture covers the origin and history of museums the world over and describes the strange early collections of "curiosities and rarities," of which Mr. Dallwig says some were "so gruesome that they caused people to go home and have bad dreams." Mr. Dallwig will also tell the story of the development of modern museums and how the behind-the-scenes operations of a great museum are carried on. He will outline the research activities of such institutions and tell how they fill their place in our educational system and what their value is to the community. This lecture is illustrated with the Museum's most modern exhibits and habitat groups that demonstrate the modern trend in illumination, art, color, etc.

Members of the Museum may use their membership cards to attend these lectures without advance reservations. All others, except out-of-town visitors and representatives of the press, must make advance reservations to attend the Sunday lectures. Reservations may be made by mail or telephone (WAbash 2-9410). The lectures are free.

Audubon Lecture March 18

"In the Hills of Gold," the fourth lecture in the current series of the Illinois Audubon Society, will be given Sunday, March 18, at 2:30 P.M., in the James Simpson Theatre of the Museum by Olin Sewall Pettingill, Jr., of Carleton College, Northfield, Minnesota. Dr. Pettingill, a distinguished ornithologist and a fine photographer, has on four occasions presented lectures in the Museum's series. His talk will be illustrated with color films made in the Black Hills of South Dakota.

Museum Members and Audubon Society members may be seated in the reserved section of the Theatre upon identifying themselves through their membership cards. The public is invited to attend this lecture, which so effectively supplements the Museum's Satuday-afternoon lecture series.

FREE SATURDAY MOVIES FOR THE CHILDREN

The Raymond Foundation will present its annual Spring Series of free motion pictures for children on Saturday mornings throughout March and April in the James Simpson Theatre of the Museum. All of the nine programs begin at 10:30 A.M. On two of the programs the explorers who made the films will be on hand to tell their stories to the children. A third personal appearance will be that of Miss Lorain Farmer of the Museum staff, who will talk to the children in connection with a film about local natural history of the Chicago area.

Children may come alone, accompanied by adults, or in groups from schools, etc. No tickets are needed.

Following is an outline of the programs:

March 3—ALLURING ALASKA
Remote and seldom-seen Alaska
Talk by Frederick Machetanz

March 10—ANIMAL TALES
Also a cartoon

March 17—LIFE IN BIBLE LANDS
Palestine 2,000 years ago
Also a cartoon

March 24—PACIFIC ADVENTURE
A naturalist in the Mid-Pacific islands
Talk by Alfred M. Bailey

March 31—STORY OF COMMUNICATIONS
Also a cartoon

April 7—SPRINGTIME IN HOLLAND
Also a cartoon

April 14—SUNRISE SERENADE
Strange dances of well-known birds
Also a cartoon

April 21—TRAILSIDE ADVENTURES
In the Chicago region
Talk by Lorain Farmer

April 28—FAVORITE LEGENDS AND FABLES
Also a cartoon

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the past month:

Department of Botany:

From: William L. Brown, Johnson, Iowa —4 herbarium specimens, Arizona; Escuela Agricola Panamericana, Tegucigalpa, Honduras—2 specimens of flowering plants, Honduras; Dr. Sidney F. Glassman, Chicago —553 phanerogams, Honduras; Instituto Agropecuario Nacional, Guatemala City, Guatemala—6 phanerogams, Guatemala.

Department of Zoology:

From: Chicago Zoological Society, Brookfield, Ill.—a crocodile and a snake, India and Peru; Lillian A. Ross, Chicago—2 snakes, Mexico; Karl P. Schmidt, Homewood, Ill.—a bird skin, Homewood; Dr. C. H. Seevers, Homewood, Ill.—a Spencer mechanical microscope stage; Dr. Julian A. Steyermark, Barrington, Ill.—a bird skin, Illinois; Loren P. Woods, Richton Park, Ill.—2 frogs, South Carolina.

Library:

From: Karl P. Schmidt, Homewood, Ill.; Woods Hole Oceanographic Institution, Woods Hole, Mass.

FIFTY YEARS AGO AT THE MUSEUM

Compiled by MARGARET J. BAUER

From the *Annual Report of the Director* for the year 1901:

"*Taxidermy.*—Work in this division has been unusually active, and results of the very highest character have been attained. New methods in mounting specimens have been adopted and in consequence a perfection of work never before attained has been secured. Five large groups are nearing completion, one of zebra and four of the Virginia deer in spring, summer, autumn, and winter, this last distinguished by a wealth of accessories and detail never before attempted in this class of work. . . .

"*Anthropology.*—Important accessions in this Department have resulted from several expeditions in the field: Mr. [Charles F.] Newcombe among the Haida Indians, Dr. [Merton L.] Miller among the tribes of the Shahaptian stock, Dr. [J. W.] Hudson in California, Assistant Curator [Stephen C.] Simms among tribes of the Pyman and Yuman stock, Assistant Curator [Charles L.] Owen among the Apache and Navajo tribes, and Curator [George A.] Dorsey among the Osage, Pawnee, and Wichita tribes."

The accompanying illustration shows a 26-foot-high gravepost of the Haida Indians, one of the important accessions of 1901. The upper part of this post of red cedar is hollowed out to make space for a coffin, which was placed in the post before raising it in a vertical position. This unique memorial column, now separated into two sections, may be seen in Joseph Nash Field Hall (Hall 10—Northwest Coast Indians).

On Museum visits, relax and lunch in the Cafeteria.

MARCH LECTURE TOURS, DAILY EXCEPT SUNDAY

Tours of exhibits, under the guidance of staff lecturers, are conducted every afternoon at 2 o'clock, except Sundays and certain holidays. On Mondays, Tuesdays, Thursdays, and Saturdays, general tours are given covering all departments. Special subjects are offered on Wednesdays and Fridays. A schedule of these follows:

Fri., March 2—Plant Travelers: Naturalized Foreign Plants. Illustrated introduction in Meeting Room (*Marie Svoboda*).

Wed., March 7—Dry Bones: Stories about Skeletons (*Lorain Farmer*).

Fri., March 9—The Adventures of Carl Akeley. Illustrated introduction in Meeting Room (*June Buchwald*).

Wed., March 14—Hats and Hair-dos: Primitive Styles in Head Ornamentation (*Harriet Smith*).

Fri., March 16—Snake Stories. Illustrated introduction in Meeting Room (*Lorain Farmer*).

Wed., March 21—Fair-Weather Friends: Those Animals that Appear with Spring (*Jane Sharpe*).

Fri., March 23—Alp and Avalanche: Mountain Areas of the World. Illustrated introduction in Meeting Room (*Anne Stromquist*).

Wed., March 28—Tomorrow's Plants: Fruits, Seeds, and Seedlings (*Miriam Wood*).

Fri., March 30—Adapt or Become Extinct. Illustrated introduction in Meeting Room (*Jane Sharpe*).

Persons wishing to participate should apply at North Entrance. Tours are free.

Technical Publications Issued

The following technical publications were issued recently by Chicago Natural History Museum:

Fieldiana: Geology, Vol. 11, Nos. 3 and 4. *Evolution and Classification of the Osteostraci* and *The Exoskeleton of Early Osteostraci*. By Robert H. Denison. January 19, 1951. 64 pages. $1.

Fieldiana: Zoology, Vol. 31, No. 41. *A Review of the Woodpeckers Chrysoptilus melanochloros and C. melanolaimus.* By Melvin A. Traylor, Jr. February 16, 1951. 18 pages.

I cannot but think that he who finds a certain proportion of pain and evil inseparably woven up in the life of the very worms, will bear his own share with more courage and submission.

THOMAS H. HUXLEY, in "On the Educational Value of the Natural History Sciences"

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS

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Chicago Natural History Museum

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

Roosevelt Road and Lake Shore Drive, Chicago 5

TELEPHONE: WABASH 2-9410

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Members are requested to inform the Museum promptly of changes of address.

MOOD FOR APRIL

The year's at the spring
And the day's at the morn;
Morning's at seven;
The hillside's dew-pearled;
The lark's on the wing;
The snail's on the thorn;
God's in his heaven—
All's right with the world.

—BROWNING

This expresses the charm of spring, although it may seem a bit too joyous for the spring of 1951!

MUSEUM IS CHOSEN FOR ALASKA EXHIBIT

Chicago Natural History Museum was selected as the location for the Chicago showing of a giant pictorial mural map of Alaska painted by the noted portrait and mural artist, Muriel Hannah, of New York. The mural, measuring 15½ feet by 9 feet, was shown in Albert W. Harris Hall (Hall 18) of the Museum for slightly more than three weeks in March.

The special feature of the map is that it has no names of single towns or locations but, instead, is spotted with vividly colored pictures that show at a glance where Alaskan industries are located, where various wild animals are found, where gold is mined, and where fish and seals are caught for the world's markets. The map was made for the Northern Consolidated Air Lines of Anchorage, which is sending it on a tour of the United States, and Chicago is the second city to receive it for exhibition. It was displayed previously in the building of the Department of the Interior in Washington, D.C. From Chicago it will go to principal cities throughout the nation under the auspices of the General Federation of Women's Clubs.

Miss Hannah spent several months in Alaska obtaining on-the-spot data for her map as well as painting a number of landscapes. She is well known for her work at the Museum School in Boston and the Art Students League in New York and for her sketches of costumes for the Mardi Gras balls in New Orleans during the past five years.

Audubon Lecture April 18

The fifth and last lecture in the current series of the Illinois Audubon Society will be given Wednesday, April 18, at 8 P.M. in the James Simpson Theatre of the Museum. The lecture is "Canada West" by Bert Harwell, of California. Mr. Harwell is known to hundreds of thousands of people through his evening lectures at Yosemite National Park where he was Park Naturalist for eleven years. He has extraordinary ability in imitating the songs of birds. His film, which he made in the wilds of western Canada, shows many close-up views of birds and mammals.

STAFF NOTES

Colin C. Sanborn, Curator of Mammals, and **Rupert L. Wenzel**, Curator of Insects, have returned after completing a successful field trip to examine a bat colony in a mine shaft at La Salle, Illinois. Curator Sanborn studied the bats and Curator Wenzel the parasites infesting them .... **John Bayalis**, Museum Photographer, has been elected vice-president of the Chicago chapter of the Biological Photographers Association .... **D. Dwight Davis**, Curator of Vertebrate Anatomy, recently addressed the Conservation Council of Chicago on "Conservation Problems in Borneo." **Karl P. Schmidt**, Chief Curator of Zoology, will address the Council on April 9 on "Conservation as Related to Agriculture in Peru and Germany."... **Emil Sella**, Curator of Exhibits in the Department of Botany, and **Samuel H. Grove, Jr.**, Assistant Artist-Preparator, have left for Florida on a botanical field trip .... **Dr. Julian A. Steyermark**, Curator of the Herbarium, recently lectured before the Barrington Lions Club on "Adventures in Collecting in Venezuela" and before the Greater Chicago Cage Bird Club on "Relation of Birds to Plant Life in the American Tropics."... **Dr. Alexander Spoehr**, Curator of Oceanic Ethnology, has been appointed chairman of the newly formed subcommittee on Pacific archaeology of the National Research Council. He also has been appointed chairman of the program committee for the annual meetings of the American Anthropological Association to be held in Chicago in November, 1951 .... **Donald Collier**, Curator of South American Ethnology and Archaeology, has been appointed chairman of the local arrangements committee of the latter organization in connection with the November meetings.

THIS MONTH'S COVER

The musical trill of the common toad heralds the coming of spring in the Chicago area and is one of the most characteristic sounds of April nights. The inflated throat-sac of frogs and toads forms a sound box that gives their voices great carrying power. Flashlight photography of singing frogs and toads is a special activity requiring great skill on the part of a nature photographer. Our cover picture was made by Cleveland P. Grant, formerly a member of the staff of this Museum and now a well-known lecturer who has appeared on several occasions before Museum audiences. The picture is used with his kind permission.

NEW MEMBERS

The following persons became Museum Members between February 16 and March 15:

Annual Members

Edward R. Adams, George A. Auer, Carl H. Beiser, Dr. Albert E. Coulon, Samuel A. Crabtree, Howard Q. Day, Mrs. Lewis J. Day, Miss Kitty Doody, G. Lane Eldred, Allen B. Gellman, George M. Gibbs, Mrs. Eleanor Y. Guthrie, Mrs. William H. Highstone, Robert W. Hunker, Wallace I. Kargman, Edwin P. Keller, R. C. Larkin, Mrs. Lloyd Lewis, Rev. Ignatius Macholz, Gunnar C. Macki, G. M. Magee, John M. McGregor, Harry G. Mitchell, John A. Muldoon, Jr., Eugene E. Mulhern, John William Paschal, Al Robandt, H. R. Sampson, Mrs. Angeline Spieth, Floyd E. Thelen, W. Lewis Ultsch.

Exhibits in Hall H of material from the Philippines are arranged to emphasize the outstanding characteristics of the cultures of the principal pagan groups throughout the archipelago.

WHEN OZARK WITCH HAZEL BLOOMS—IT'S SPRING!

By JULIAN A. STEYERMARK
CURATOR OF THE HERBARIUM

Toward the end of a winter, conversation in the Chicago region often turns to signs of spring. For some people the appearance of a robin is a hopeful sign. Actually, it doesn't mean much, since robins may be seen locally all winter long. For others, the sight of geese winging their way northward or the croaking, trilling, or peeping of frogs and toads is of significance (see cover picture of this month's BULLETIN). But, in my experience, the Ozark witch hazel (*Hamamelis vernalis*) beats all other contenders for the honor of welcoming the glorious season of springtime. Regardless of how we may feel about the outside temperature going above 70° F to be convinced that spring is really here and whether we like to admit it or not, the opening of the first flower should decide for us when spring has really started.

Apparently few people realize that a distinct type of a native American witch hazel blossoms in early spring. When witch hazel is mentioned, nearly everybody thinks of the eastern witch hazel (*Hamamelis virginiana*), found in rich woods in the Chicago area and blooming in late fall or early winter (September through December). The four narrow strap-shaped petals of each flower are bright yellow and lighten up the drab woodlands of late fall and early winter when all or most of the leaves have fallen from the trees.

NOT NATIVE TO CHICAGO AREA

In contrast to the wild witch hazel of the Chicago region that blooms toward the close of the year, the Ozark witch hazel is a stranger in this area, its natural range being to the southwest of us in southern Missouri, Arkansas, Oklahoma, and Louisiana, where it hugs the gravel and sand bars along the streams of timbered hilly country. There, in its native haunts, it starts blooming in late December and continues blossoming until late March or early April. Its blossoms are usually quite fragrant and more red and orange in color than the distinctly yellow flowers of the eastern witch hazel of the Chicago region. When grown around the Chicago area, the Ozark witch hazel adapts itself very nicely and favors us with its showy flowers. According to records of the Morton Arboretum near Lisle, Illinois, which were kindly furnished to me by E. L. Kammerer, the Ozark witch hazel has started to blossom there as early as January 5, as during the comparatively mild winter of 1950. Mr. Kammerer states that in previous years the earliest record for the Ozark witch hazel there was January 25. This year, following a very severe winter, the Ozark witch hazel did not begin to flower at the Morton Arboretum until March 5. North of Barrington, where I have some Ozark witch hazel growing, the flowers opened on the branches on the same day, showing that the Ozark species responded to the sudden mild temperatures of late February and early March alike around Barrington and Lisle, Illinois.

FLOWERING COMPANIONS

It might be supposed that only the Ozark witch hazel stands out as the first flower of the spring, regardless of the outside temperature. Actually, however, snowdrop (*Galanthus nivalis*) and certain species of crocus (not the popular Dutch crocus that blooms later), natives of the Old World, may be found in bloom about the same time in the Chicago area as the Ozark witch hazel. In fact, it was noted this year, as previously, that the snowdrop started to bloom on March 5 when the witch hazel also opened. Mr. Kammerer informed me, likewise, that on January 3 of last year, when Ozark witch hazel was in bloom at the Morton Arboretum, snowdrop and some crocus species were sharing the limelight as first bloomers. Among the native species of the Chicago region, the skunk cabbage (*Symplocarpus foetidus*) is, of course, the first to blossom. Its peculiar hood-protected blossoms arise in great profusion above the wet soil of swamps in which it grows and in late February and early March its flowers attract insects that may be out at this time.

EASTERN OR COMMON WITCH HAZEL

Hamamelis virginiana, showing a flowering and fruiting branch with dead leaves. This is a native of the Chicago area and blooms in late fall or early winter (September through December). The Ozark witch hazel (Hamamelis vernalis) resembles this, but has flowers that appear from January to April and are more brilliantly red- to orange-colored.

It should be mentioned here that the genus to which the witch hazel belongs (Hamamelis) also includes other species that are rather remarkable in their season of flowering. Of four species found in Asia, two of them (*H. japonica* and *H. mollis*) are often cultivated in the United States and are unusual in that they bloom during the winter months, even when the temperature is down to zero. Another New World species of witch hazel of which little is known is one found wild in Mexico (*H. mexicana*).

Besides the witch hazels the family includes about 20 other genera found chiefly in the subtropical and warm temperate regions of both hemispheres. Some are familiar to us. For example, the very striking and handsome tree, sweet gum (*Liquidambar Styraciflua*), is a native of the United States, Mexico, and Central America. The genus *Fothergilla* of the southeastern United States, with showy clusters of flowers, is often cultivated. Other genera cultivated in this country and belonging to the same family are *Disanthus, Distylium, Parrotia, Parrotiopsis, Corylopsis, Fortunearia, Sycopsis,* and *Sinowilsonia*. A genus recently described is *Matudaea*, found in Mexico and Central

(*Continued on page 8, column 1*)

LAYMAN LECTURER TO TELL STORY OF DIAMONDS

"The Romantic Story of the Diamond" is the subject for April of the Sunday afternoon Layman Lectures by Paul G. Dallwig, who will present this lecture on April 1, 8, 15, 22, and 29, closing the current season. Mr. Dallwig's next appearances at the Museum after the end of this month will be in the autumn. The April lectures will begin at 2 P.M. and end at 4:30 P.M. Midway there will be an intermission for tea or other refreshments in the Museum cafeteria.

April being the "Diamond Month," this lecture gives the fascinating story of the diamond from the finding of the first diamonds in India, Brazil, and Africa to the present great diamond industry. The lecture covers the intriguing stories of love, hate, greed, and murder attached to the successive ownership of the world's famous historic diamonds. A three-act stage dramatization is presented by the Layman Lecturer: Act I.—The Original Find; Act II.—The Diamond Rush; Act III.—A Trip through a Diamond Mine. There will be a social half-hour in the Museum's Gem Room after the lecture.

Members of the Museum may use their membership cards to attend these lectures without advance reservations. All others, except out-of-town visitors and representatives of the press, must make advance reservations to attend the Sunday lectures. Reservations may be made by mail or telephone (WAbash 2-9410). The lectures are free.

FOUR MORE SATURDAY MOVIES ARE OFFERED FOR CHILDREN

The Raymond Foundation will continue its annual Spring Series of free motion pictures for children on Saturday mornings through April in the James Simpson Theatre of the Museum. The four remaining programs begin at 10:30 A.M.

Children may come alone, accompanied by adults, or in groups from schools, etc. No tickets are needed.

Following is an outline of the programs:

April 7—SPRINGTIME IN HOLLAND
Also a cartoon

April 14—SUNRISE SERENADE
Strange dances of well-known birds
Also a cartoon

MOVIE DAY AT THE MUSEUM

Youngsters reflect avid interest in Saturday morning programs of the Raymond Foundation

April 21—TRAILSIDE ADVENTURES
In the Chicago region
Talk by Lorain Farmer

April 28—FAVORITE LEGENDS AND FABLES
Also a cartoon

Another series of children's movies will be given on Thursday mornings in July and August.

SHARK-LIVER OIL USED IN 'BAROMETERS'

BY LOREN P. WOODS
CURATOR OF FISHES

THE FACT that shark livers are rich in oil is known to fishermen wherever sharks are caught. The livers of certain kinds of sharks are larger and contain more oil than others. Within the past ten years the oil from the liver of certain sharks living along the Pacific Coast of the United States and Mexico has been found to be especially rich in Vitamin D, and the shark fishery for this purpose is of considerable importance.

Among less generally known uses of shark-liver oil is that employed by ornithologists to concentrate a variety of oceanic birds into a relatively small area so that the birds may be collected. A shark liver is allowed to macerate in a tub. The collector then puts out to sea, splashing a dipper full of oil and broken-down liver tissue into the water every yard or so, thus forming a slick or "petrel trail." After the oil is all gone, he has but to return along his baited trail and shoot the birds that gather from far and wide.

The ichthyologists of the Bermuda Deep-Sea Expedition of this Museum learned of an entirely unexpected use for the abundant liver oil of the nurse-shark (*Ginglymostoma*) in the bottle "barometer," the aid and guide of all Bermuda sailors and fishermen. To prepare a shark-liver-oil-"barometer," one obtains the fresh liver usually of a nurse-shark or one of the other varieties of small sharks common in the waters about the islands. The kind of shark apparently is not so important as the condition of the liver, which must, according to all accounts, be white or at least pale in appearance.

To extract the oil the liver is either hung in a cloth bag and the oil allowed to drip out or the liver is boiled and the oil squeezed out. A small quantity of the liquid thus secured is then placed in a six to ten-ounce bottle and corked, although a screw-top bottle apparently works just as well. Directions given by some are that the bottle must be hung in the sun, by others that the "barometer" will work just as well no matter where it is placed.

Liver oil that is extracted by either of the two methods described above contains a considerable amount of white flocculent precipitate in suspension. In a very short time this white matter settles out, leaving the clear pale-yellow oil above. Now the "barometer" is ready to work. It is believed that whenever the weather becomes unsettled a fine cloud of the precipitate will rise into the clear oil. If the bad weather continues for some time, the fine cloud will become murky. Hurricanes are said to produce a rapid and violent reaction of this type. When fine weather is once more returning, the oil is quickly as clear as the sky.

The actual value of this "barometer" as a forecaster was not ascertained because only two (one made by the drip process and one by the boiling method) were under my observation for only a short time. During this time there were two periods of bad weather, both coming on very rapidly. On each occasion the storm glasses reacted as expected by becoming cloudy, and they cleared again with the gradually clearing weather. But the change came on so suddenly that the question of forecast was not settled.

From several Bermudians questioned no explanation was forthcoming concerning why the storm glass works. It was suggested that the reaction that occurs is brought on by change in the atmospheric pressure and that the material is sensitive to this change. How this could be possible when the reacting system is tightly sealed in a glass bottle is not explained. However, in spite of lack of explanation, many Bermudians have far more faith in their shark-liver oil than in the official weather forecasts.

To call any sort of weather-sensitive device a barometer is a common practice. Strictly speaking, a barometer is an instrument for recording changes in atmospheric pressure. Here in the United States there have been produced instruments consisting of a thermometer alongside a sealed glass tube filled with a mixture of alcohol and water with a small amount of dissolved gum camphor to which has been added some ammonium chloride and potassium nitrate. The technical term for such an instrument is "baroscope." With changes in temperature the amount of precipitate changes regardless of whether or not the temperature change is accompanied by rain or storm. One of these instruments was carefully observed during the changeable weather of January and February, 1950. It was found that with a drop in temperature, regardless of other weather conditions, the amount of precipitate increases and the clear upper fluid becomes cloudy exactly as did the shark-liver oil. In spite of belief and the use of words like "barometer" and "baroscope," atmospheric pressure evidently does not have anything to do with the changes in the solution. Thus the conclusion arrived at is that such instruments are interesting from the standpoint of folklore but are apparently useless as weather forecasters.

BIRD APARTMENT HOUSES

By AUSTIN L. RAND
CURATOR OF BIRDS

EVERY NOW AND THEN, in our press, appear blasts against crowded living conditions in our cities, especially the tenements where people are crowded together. Often there is the implication that this type of thing is unnatural and abnormal. And yet when we look about us in the bird world we see that gregariousness is a common trait. We have only to remember the great flocks of starlings and blackbirds in the autumn or the massed flights of water fowl. Not only in traveling

and in feeding but also at nesting time birds may gather together, and some birds nest in such close association that the terms "apartment house" or "tenement" are really applicable.

The martins' house on our lawn with perhaps dozens of closely spaced rooms (some houses have as many as 200 rooms) is a case in point. The neat martin house of boards is a man-made thing; but before the white man came to this continent and before the Choctaw Indians hung up groups of hollow gourds for the martin colonies to use, the martins nested in colonies. Even in recent years certain colonies that we might consider unprogressive have been reported as using such diverse nesting situations as among the boulders of a lake shore in Minnesota and the closely spaced woodpecker holes that riddled a dead pine in Florida. And probably it was always thus. The martins like company at nesting.

CLIFF DWELLERS, TOO

Perhaps it would not be proper to consider a colony of bank swallows, each with a separate burrow in the same small cut bank that is roofed with the same few square yards of turf, as a real apartment house of cliff dwellers. But the term has been used in connection with a West Indian woodpecker, where a dozen pairs were nesting in a single dead tree and "the trunk was a veritable apartment house" (Wetmore and Lincoln, 1934). A similar situation exists in the naked-faced barbet of West Africa. This bird, too, makes a hole in a dead tree for its nest, like a woodpecker, and colonies of 30 to 50 birds may be found nesting in a single dead tree, while other dead trees near-by, apparently equally suitable, are untenanted. Colonies of hundreds of nests of cliff swallows, the nests touching and overlapping, may be under the eaves of a single barn or, as they used to be and some still are, on the sheltered side of a cliff. But as these birds had nothing to do with the making of the roof, perhaps these, too, do not deserve to be rated as apartment houses.

In southern South America there is a monk parakeet that makes a real tenement. It nests colonially in tree tops, and the nests of sticks are placed so close together that they merge and form a single mass, up to 9 feet across, in which each parakeet has its own nest. Similar to this is the palm chat. This West Indian bird is small and thrush-sized, dull in color, brownish with a streaked breast, and nothing remarkable to look at; but it carries amazingly large sticks, a little thinner than a lead pencil and up to two feet or more long, to the top of a palm tree and there makes its bulky community nest.

BUILD NESTS CO-OPERATIVELY

These stick nests, which may be four feet and more across, are conspicuous and regular features of the landscape in Hispaniola. The colony consists of four to eight pairs of birds, and each has its own apartment in the bulky structure and its own passageway to the outside. But in the parts of the community nests that hold the individual nests together and cover them, there are roughly defined passages running through the interlacing twigs of the top of the nest so that the birds can creep almost under cover. Apparently some of the work is carried on in common, for as many as half a dozen birds may be working close together, pulling and twisting twigs more firmly into place (Wetmore and Swales, 1931).

The sociable weaver is the most advanced apartment builder. It, like the palm chat, has little of distinction in its appearance, being mostly dull brownish with a black face. But in its home country, on the savannas of Rhodesia in South East Africa, its huge community nests in the savanna trees may be seen from afar. The largest community nest Friedmann saw, when he was studying the bird there, was about 25 feet long, 15 feet wide, and 5 feet high and contained about 95 nests. This might have been still bigger, for part of it had broken the branch on which it rested its weight and fallen to the ground.

Sir Andrew Smith, the early ornithologist of South Africa, has written that when these birds start a colony they first make a roof of coarse grass. The group to which the sociable weaver belongs gets its name from the remarkable ability some of them have of weaving their nesting materials. But the sociable weaver neither plaits nor weaves its roof. It puts the roof together in the form of a well-made hay rick with a fairly definite thatching arrangement so that the water runs off. This is a community effort. Under this roof each individual pair makes its own separate nest. These apartment houses are used year after year, but last year's chambers are not used, new ones being made under the roof each year. And so the apartment house grows bigger and bigger until the weight of the mass may break the branches and cause a part or the whole to fall to the ground.

LECTURES ON SATURDAYS CONTINUE IN APRIL

The Spring Course of free lectures on travel and science illustrated with natural-color motion pictures will continue through April on Saturday afternoons in the James Simpson Theatre of the Museum. The lectures begin at 2:30 P.M.

Limited accommodations make it necessary to restrict these lectures to adults. Members of the Museum are entitled to reserved seats on application. For children, free motion pictures will be presented on the mornings of the same Saturdays by the Raymond Foundation.

Following are the dates, subjects, and lecturers:

April 7—VENEZUELA VENTURE
A trip to the world's highest waterfall
Nicol Smith

April 14—EARLY AMERICAN INDIANS
1950 archaeological work of the Museum
Paul S. Martin

April 21—ANCIENT AND MODERN MEXICO
A biologist tours a popular vacation land
Harry J. Fuller

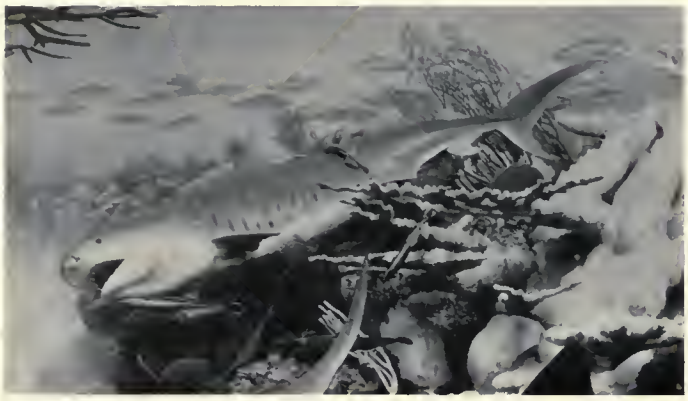
April 28—THROUGH THESE DOORS
A glimpse of this Museum's activities
John R. Millar

No tickets are necessary for admission to these lectures. A section of the Theatre is reserved for Members of the Museum, each of whom is entitled to two reserved seats. Requests for these seats should be made in advance by telephone (WAbash 2-9410) or in writing, and seats will be held in the Member's name until 2:25 o'clock on the lecture day.

FISHES THAT TAKE ABODE WITHIN OTHER ANIMALS

By ROBERT KANAZAWA
FORMER ASSISTANT, DIVISION OF FISHES

One of the most interesting subjects in the realm of nature is the association of one creature with another in varying degrees of dependence. All these relations fit into the general heading of "symbiosis" (living together). There is the association called parasitism (derived from the Greek word "para," meaning beside, plus "sitos," meaning food), in which one creature lives on or in another organism from which it directly gets nourishment; mutualism (from the Latin word "mutuus," meaning exchange), in which two different organisms live in association, each gaining benefit from the other; commensalism (derived from the Latin root "com-," together, plus "mensa," table), for animals eating at the same table, usually with a larger host; and inquilinism (derived from the Latin word "inquilinus," meaning dweller in another place), in which one creature lives in the abode of another without benefit to the host or even within the body of a host without injury to it. These different types of associations are found among the fishes, both with each other and with other animals.



COMMENSALISM

An association between a sucking fish, Echeneis, and a tiger shark. Part of the Bahamas group in Hall of Fishes (Hall O).

A parasitic association exists in the case of the small South American catfish *Stegophilus insidiosus*, which is known to live in the gill cavity of its large relative, the loango, *Pseudoplatystoma coruscans*. At first the small catfishes were mistaken for the young of the loango, which it was thought were being carried in its mouth; later they were interpreted as mess-mates living on small organisms drawn into the mouth of the large fish. Later discovery attests that the catfish is a true parasite, living among the gills of its host and feeding on its lifeblood. Other species of the same family are now known to have similar habits.

AT HOME IN TENTACLES

An association of mutualism is found between several species of brilliantly colored damsel fishes of the genus *Amphiprion*, family Pomacentridae, and the large brightly colored sea anemones. Instead of occupying a hole or cranny like the other members of the family, these damsel fishes have a living house, a house so protected that no foe dares attack them when they enter the flower-like portal of their strange abode. This living home is within the tentacles of large sea anemones of the genera *Stoichactes* and *Discosoma*. Anemones of this kind are widely distributed in the Indo-Pacific region. Their tentacles are equipped with hundreds of deadly stinging organs that paralyze any organisms, including fishes, that come too close. How the damsel fishes escape death or injury from these myriad stinging organs remains a mystery. Some authorities believe that they must be immune to the nettle-cell venom.

All the species of *Amphiprion* inhabit sea anemones and dwell with them in mutual relation. At least six species are known to live in as many species of anemones. A male and female damsel fish usually take up residence in a sea anemone. Both parents care for the eggs usually laid near the base of their host. After hatching, the young damsel fishes rise to the surface and have a period of planktonic life, after which they descend to the bottom in search of a home for themselves. When not enough homes are available, several fishes are found in a single host. As many as seven damsel fishes, ranging in length from 10 mm. to 100 mm.

MUTUALISM

An association between the man-o'-war fish, Nomeus, and the Portuguese man-o'-war fish, Physalia. Courtesy American Museum of Natural History in New York City.

EXTREME MUTUALISM

An association between the damsel fish, Amphiprion, and the sea anemone, Discosoma. Courtesy of D. Van Nostrand Co., Inc.—from "The Ways of Fishes" by L. P. Schulz and E. M. Stern, of U. S. National Museum.

have been found in a single sea anemone. The damsel fishes recognize the species of sea anemone normally utilized and disregard others.

BRING FOOD TO HOST

Extensive series of experiments with these damsel fishes and sea anemones were carried out at the Silliman Institute in the Philippines. For observation an anemone of the type frequented by damsel fishes, specimens of *Amphiprion* of the right species, and other small fishes of similar sizes were placed in an aquarium with shrimps and other tidbits. A marked difference in the behavior of the damsel fishes and that of the other fishes was observed. The latter seized a fragment of food and scurried away to some nook to eat it in safety. Upon devouring one morsel they returned for more. On the other hand, the damsel fishes darted upon the food, seized a mouthful, and dropped it among the tentacles of the sea anemone. They returned for other bits, which in turn were quickly placed in storage. When the food was exhausted, the damsel fishes enentered the charmed circle of stinging tentacles and feasted at their leisure. Thus, the sea anemone and damsel fishes were both abundantly fed.

The shrimps and other small fishes wandering too close to the tentacles were promptly killed, but when a damsel fish darted among the tentacles they curled away from the dauntless tenant. Damsel fishes are feeble swimmers, never venturing more than a short distance from their home and fleeing to the safety and seclusion of the tentacles when alarmed. Sometimes the damsel fishes bite off a mouthful of tentacles or feed upon the mucus or buds of the tentacles. Dutch investigators at Batavia, Java, found that the damsel fishes help the sea anemones by carrying away rejected food and waste matters, by circulating water, and by rubbing over ailing parts of the anemone.

Another curious association of mutualism is found between the Portuguese man-o'-war, a floating jelly-fish of the genus *Physalia*, and the beautiful man-o'-war fish of the

genus *Nomeus*. The man-o'-war fish, a few inches long, seeks shelter among the deadly tentacles of the *Physalia*, which, like the sea anemone, possesses hundreds of deadly stinging organs, called nematocysts, by means of which it paralyzes its victims. These beautiful fishes are similar in color to the jelly-fish, with cross bars of purplish color. The man-o'-war fish is thought to possess some immunity to the poisonous organs, and in return for this protection probably lures other fishes to destruction.

ADHESIVE HITCHHIKERS

The relation of commensalism is found between the remoras or sucking fishes, of the family Echeneidae, and the sharks. The sucking fishes are remarkable for the possession of an oval adhesive disc placed on the broad flat upper surface of the head. With these discs the sucking fishes attach themselves to the bodies of sharks, mantas, barracudas, swordfishes, whales, turtles, or even to bottoms of ships. In this way they are not only protected from their enemies but also are transported to new feeding grounds. Once among a shoal of fishes they soon detach themselves and swim actively about in pursuit of prey, seeking a fresh anchorage when their appetites have been satisfied. When the host is feeding on some other animal, the sucking fishes may obtain some of the fragments floating in the water. The young of these fishes are known to take refuge frequently in the mouth and gill chamber of their host. It seems the sharks pay little or no attention to the young hitchhikers and so far no remains of sucking fishes have been found in their stomachs. Remoras are shown in their regular association with sharks in the Museum's underwater Bahama group (Hall O).

An association of inquilinism is found between the young squirrel hake (a relative of the cod fish), *Urophycis chuss*, about 2 to 6 inches in length, and the giant scallop, *Pecten magellanicus*. The young squirrel hake seeks shelter within the shell of the scallop. The sea snail, *Liparis lineatus*, a tadpole-like fish with a sucking disc, takes refuge in the shell of the large scallop, *Pecten tenuicostatus*. In the West Indies a little cardinal fish, *Astrapogon stellatus*, has a curious association with a large sea snail, a conch, *Strombus gigas*. The cardinal fish seeks shelter and safety in the mantle cavity of its large host. These fishes are generally found with their snail hosts in waters from two to five meters in depth. Another example is a goby, a little fish whose pelvic fins are modified into a funnel-shaped disc, that often lives within the shells of oysters, other bivalves, conches, and sponges. These associations show a one-sided benefit with no apparent benefit to the host.

Among the strangest of all relations is that found between the pearlfishes, *Carapus*, a small eel-shaped fish a few inches in length, and the sea cucumbers of the genus *Holothuria*, a relative of the starfish and the sea urchin. The pearlfish spends most of its time in the cloaca and the alimentary canal of the sea cucumber, sometimes entering the loop of the intestinal canal and occasionally the respiratory tree. By wiggling its body, the pearlfish enters its host either head or tail first. Sea cucumbers living in deeper waters may contain as many as seven pearlfishes. Often the same fish seeks shelter within the mantle cavity of the pearl oyster, an association that sometimes proves fatal to the pearlfish, for it occasionally becomes imprisoned by the oyster and its body sealed up in layers of mother-of-pearl. Pearlfishes are also found to seek shelter within large specimens of sea urchins and starfishes. This association seems to be a one-sided affair; the pearlfish receives shelter from the sea cucumber and apparently gives no benefit in return.

APRIL LECTURE TOURS, DAILY EXCEPT SUNDAY

Tours of exhibits, under the guidance of staff lecturers, are conducted every afternoon at 2 o'clock, except Sundays and certain holidays. On Mondays, Tuesdays, Thursdays, and Saturdays, general tours are given covering all departments. Special subjects are offered on Wednesdays and Fridays. A schedule of these follows:

Wed., April 4—Nature Magic: Disappearing Acts and Deceptive Devices (*Harriet Smith*).

Fri., April 6—The Story of the Dunes. Illustrated introduction in Meeting Room (*Marie Svoboda*).

Wed., April 11—Animals in Art (*Jane Sharpe*).

Fri., April 13—Gilding the Lily: Make-up and Related Ornamentation by Primitive Peoples. Illustrated introduction in Meeting Room (*Harriet Smith*).

Wed., April 18—Killers: Animal, Vegetable, and Mineral (*Anne Stromquist*).

Fri., April 20—Sights and Sounds of Spring: Flowers, Birds, Frogs, etc. Illustrated introduction in Meeting Room (*Miriam Wood*).

Wed., April 25—Natural History Facts and Fallacies (*Lorain Farmer*).

Fri., April 27—Animal Pets of Other Countries. Illustrated introduction in Meeting Room (*June Buchwald*).

Official Visitor from Japan

Hiroto Honda, secretary general of the Science Council of Japan and Japan Academy, visited the Department of Anthropology in March. Mr. Honda was sent to this country to make a study of various scientific institutions in the United States and to find out how much integration there is between the sciences and daily life.

Books

(All books reviewed in the BULLETIN *are available in The Book Shop of the Museum. Mail orders accompanied by remittance including an allowance for postage are promptly filled.)*

THE FRESH-WATER ALGAE OF THE UNITED STATES. Second Edition. By Gilbert M. Smith. McGraw-Hill, New York, 1950. viii+720 pages, 559 text figures. Price $10.

Perhaps nothing has given greater impetus to the study of fresh-water algae of this country than the original issue of this book in 1933. Now an enlarged and considerably revised edition has appeared. Some general information has been added to the three introductory chapters. Many more genera have been introduced as the author has considered the published reports of them to be reliable. The conspicuous difference between the two editions, as pointed out in the preface, is the omission here of descriptions of species in the smaller genera. This may be in the interest of saving space, but it seems to me that the result is the omission of a great deal of information about the algae that is henceforth available to the student only when he consults the first edition. With only the genera treated in detail, the new edition will be found useful primarily as a textbook for the classroom, containing a larger quantity of information than is to be found in the same author's *Cryptogamic Botany*, Volume I (1938).

The various groups of algae are here treated as divisions of the plant kingdom rather than as classes, as they were in the first edition. The key to genera has been enlarged, and many references have been added to the bibliography. The illustrations are excellent.

The text is well printed except for a number of pages (in the copy made available to me by the publishers) in the Division Chlorophyta. Certain errors in spelling (like *Chlorotylium cataractum* instead of *C. cataractarum*) have been carried over from the first edition; others (like *Pharphyrosiphon* instead of *Porphyrosiphon*) are here first introduced. Dr. Smith has included many generic names published since 1935 without benefit of Latin descriptions. Since these names are illegitimate according to the international rules of nomenclature, it seems to me unfair that the unsuspecting beginning student should be initiated into a new field of science in terminology condemned by the International Botanical Congresses.

FRANCIS DROUET
Curator of Cryptogamic Botany

OZARK WITCH HAZEL—

(*Continued from page 3*)

America. *Bucklandia* and *Rhodoleia* are interesting Asiatic members of the family.

AN OLD FAMILY

The witch hazel family, as a whole, must be very old. Fossil remains referable to this family date back millions of years to the late Cretaceous. We should, therefore, look with great appreciation upon these interesting plants that are so welcome in earliest spring as well as late fall. Whether we agree with the weather man or not, spring was already heralded some time ago by the appearance of the Ozark witch hazel and its companions, the snowdrop, crocus, and skunk cabbage. Later on, the other early bloomers, such as the pussy willow, snow trillium, and hepatica, will follow.

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the past month:

Department of Anthropology:

From: Kitty Faust, Evanston, Ill.—a piece of tapa, Polynesia.

Department of Botany:

From: Department of Botany, Southern Methodist University, Dallas, Tex.—29 algae, Texas; Department of Botany, University of Wisconsin, Madison—19 Amaranthus, Bolivia; Archie F. Wilson, Flossmoor, Ill.—10 phanerogams, Korea; Dr. G. S. Winterringer, Illinois State Museum, Springfield—125 phanerogams, Illinois.

Department of Geology:

From: Hans E. Chlupac, Vienna, Austria —51 gastropod specimens, Austria; Mississippi Geological Survey—an ammonite specimen, Sphenodiscus okatus, Mississippi; Robert T. Thompson, Cave Creek, Ariz.—a specimen of specular hematite, Arizona.

Department of Zoology:

From: Walter Auffenberg, DeLand, Fla.—a snake, Florida; Dr. Roger W. Barbour, Lexington, Ky.—26 salamanders, Harlan County, Kentucky; Dorothy E. Beetle, Laramie, Wyo.—a collection of non-marine shells, Wyoming and Colorado; Graham Burnside, Laramie, Wyo.—7 mammals, Wyoming; Chicago Zoological Society, Brookfield, Ill.—a European badger (captive) and 2 mammals, Peru; Hermano Daniel, Medellín, Colombia—35 frogs, 4 lizards, 13 snakes, Colombia; Leo F. Focha, Sebastopol, Calif.—a collection of marine shells, California; Harry Hoogstraal, Cairo, Egypt—a bird skin, 5 fishes, 344 mammals, 54 lizards, and 91 snakes, Egypt; Leslie Hubricht, Danville, Va.—a collection of land and fresh-water shells, various localities; Lincoln Park Zoo, Chicago—a cassowary (zoo bird); Joe Opat, Hinsdale, Ill.—a domesticated chinchilla; Lawrence O'Toole, Evergreen Park, Ill.—a chinchilla (captive); J. D. Romer, Kew, Surrey, England—9 frogs, Hong Kong; Dr. Glen C. Sanderson, Marion, Iowa—a turtle, Iowa; Steward Springer, Pascagoula, Miss.—a collection of marine invertebrates, Gulf of Mexico; Dr. J. A. Tubb, Sandakan, North Borneo—12 bats, Sandakan, North Borneo; Irwin L. Young, Chicago—2 adult male gorilla skeletons, Cameroon.

Library:

From: Dr. Fay-Cooper Cole, Santa Barbara, Calif.; Eugene S. Richardson, Jr., Winnetka, Ill.; L. C. Stuart, Ann Arbor, Mich.; Rupert L. Wenzel, Oak Park, Ill.

STANLEY FIELD HALL

Every visitor entering this museum by either the north or south entrance finds himself immediately in Stanley Field Hall, named in honor of Stanley Field, who has been the institution's President and one of its foremost Benefactors for more than forty years. It occupies the great central nave, extending some 300 feet or practically the length of the building and reaching seventy-five feet to the sky-lighted roof. With its tall Ionic pillars and the series of arches overlooking it from the galleries on the second floor, it carries out to the full the beauty of the classic Greek architecture that marks the building's exterior. At each end, across the hall, is a larger archway. The arch at the north is flanked by heroic size sculptures representing "Natural Science" and "Dissemination of Knowledge," while at the south are figures emblematic of "Research" and "Record." These four statues are the work of an eminent sculptor, Henry Hering.

This hall contains representative exhibits from each of the four scientific Departments of the Museum (Anthropology, Botany, Geology, and Zoology), the aim being to give an introductory view of the sciences that come within the institution's scope. Some of these exhibits are permanent; others are changed from time to time to show new acquisitions or the results of expeditions. Occasionally a special exhibit is arranged to present material related to some timely event such as the observance of Conservation Week or the centennial of some great man of science.

Technical Publications Issued

The following technical publications were issued recently by Chicago Natural History Museum:

Fieldiana: Zoology, Vol. 31, No. 42. *Amphibians and Reptiles of the Hopkins-Branner Expedition to Brazil.* By Karl P. Schmidt and Robert F. Inger. February 23, 1951. 28 pages. $0.40.

Fieldiana: Zoology, Vol. 31, No. 43. *A New Lizard of the Genus Varanus from New Guinea.* By Robert Mertens. February 23, 1951. 6 pages. $0.40.

Fieldiana: Zoology, Vol. 31, 44. *Two New Mammals from Southern Peru.* By Colin Campbell Sanborn. February 23, 1951. 6 pages. $0.40.

FIFTY YEARS AGO AT THE MUSEUM

Compiled by MARGARET J. BAUER

From the *Annual Report of the Director* for the year 1901:

"Mr. Surber, the regular collector in the Department of Zoology, resigned in the early spring and Mr. Edmund Heller was engaged to succeed him. He is now at work on the Pacific coast, where he has been unusually successful, having in a short space of time added a number of species not represented in the collections. The visit of Mr. Meek, accompanied by a volunteer assistant, to southern Mexico for the purpose of collecting mammals, fishes, reptiles and insects, was highly important. The collection of fishes obtained was naturally the largest and most important from a scientific standpoint, as it will furnish more material to work out the geographical range of the North American forms which are found in southern Mexico, and the limit of South American fishes which are found in Central America and which go north into southern Mexico, that has been collected in that country."

[Mr. Meek's Mexican collections turned out to be of great scientific importance.]

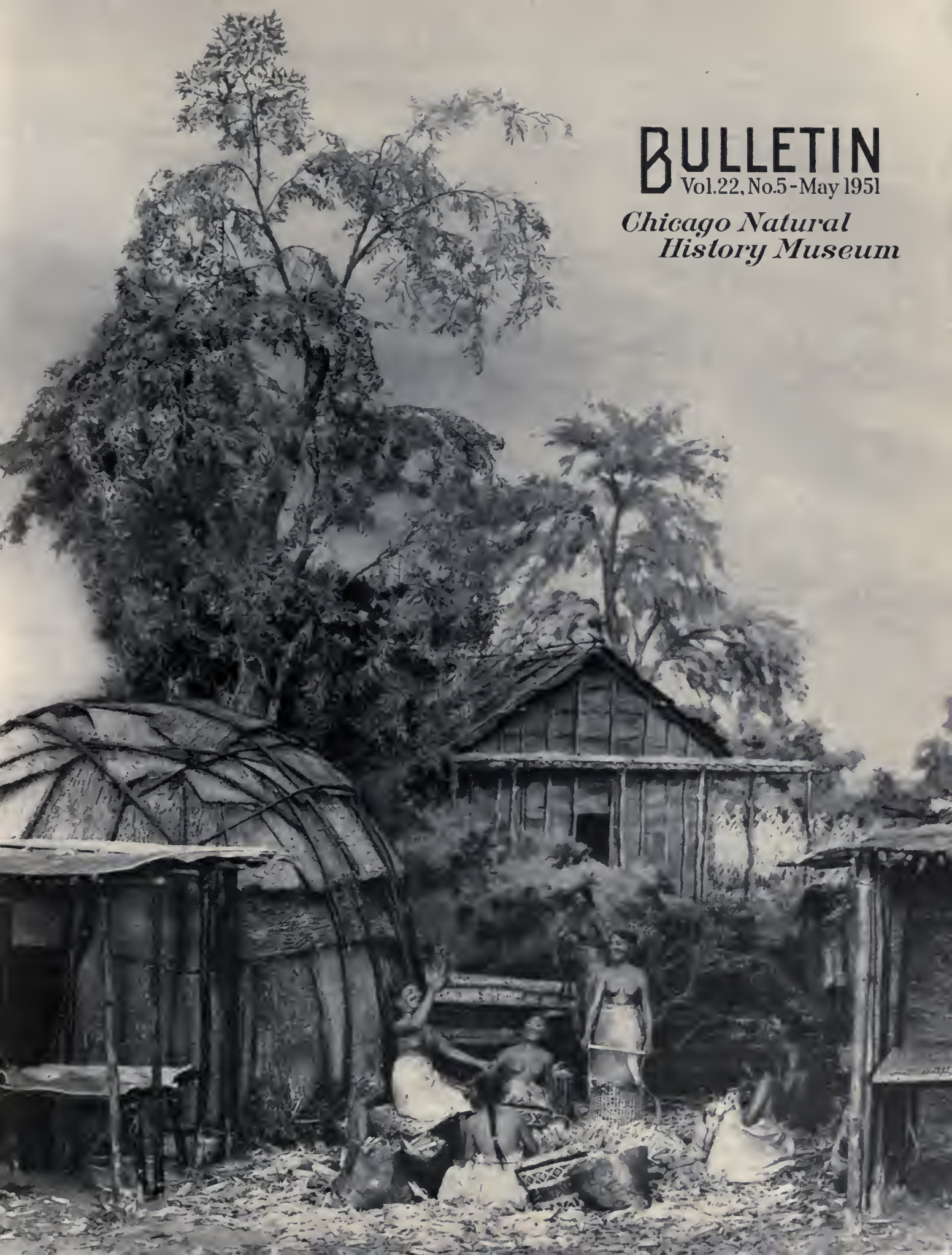
* * *

A femur and humerus of a dinosaur, the largest ever discovered (to 1901), were placed on exhibit. The femur pictured below was 6 feet 8 inches high and weighed

H. W. Menke with femur of Brachiosaurus. Mr. Menke, a preparator and photographer who accompanied paleontological expeditions, retired from the Museum staff in 1904.

675 pounds. This specimen, then referred to the genus *Camarosaurus*, was later made the type of *Brachiosaurus altithorax* by E. S. Riggs.

PRINTED BY CHICAGO NATURAL HISTORY MUSEUM PRESS



BULLETIN

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Chicago Natural History Museum

Chicago Natural History Museum

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Members are requested to inform the Museum promptly of changes of address.

JOHNS HOPKINS HERBARIUM RECEIVED AS GIFT

The Museum recently received as a gift the valuable and historically interesting herbarium of Johns Hopkins University, Baltimore, Maryland. This herbarium consists of nearly 10,000 specimens, some 2,600 of which represent cryptogams (mostly algae and mosses), the others being ferns and flowering plants. Notable collections included among cryptogams are the Johnson collection of algae, largely from the Atlantic Coast of North America, North American mosses of the collection of the Reverend S. M. Newman, and mosses collected in Italy and other European countries by Carlo Fitzgerald.

The collections of flowering plants and ferns include those of W. Schimper from Europe and Jamaica, those of F. Ahlberg and J. E. Zetterstedt from Scandinavia, those of E. Stahl and Lerch from Europe, those of McKenzie from the South Sea Islands, those of the late Professor D. S. Johnson from Jamaica, and many others, especially specimens from Maryland and other parts of the United States. As many of these specimens were collected nearly 100 years ago, they represent valuable and welcome records and additions to the Museum's herbaria. The transfer of this herbarium as a gift was arranged by Professor B. H. Willier, Chairman of the Department of Biology, and his associate, Dr. Carl P. Swanson, with the approval of Dr. Detlev W. Bronk, President, and the Trustees of Johns Hopkins University.

Dr. Theodor Just, Chief Curator of the Department of Botany, was instrumental in creating the liaison between the Museum and the Johns Hopkins authorities.

GUGGENHEIM FELLOWSHIP AWARDED TO CURATOR

Bryan Patterson, Curator of Fossil Mammals, has been awarded a John Simon Guggenheim Memorial Foundation Fellowship for 1951–52. During his tenure of the fellowship, Curator Patterson will carry out studies on South American Tertiary vertebrates. The Marshall Field Paleontological Expeditions to Argentina and Bolivia during 1922–27 under the leadership of Elmer S. Riggs, former Curator of Paleontology at the Museum, brought together magnificent collections of fossil vertebrates. Curator Patterson has worked on this material for a number of years, and the fellowship award should enable him to bring his studies to a satisfactory conclusion.

Former Guggenheim fellows on the Museum staff are Karl P. Schmidt, Chief Curator of Zoology, Colin C. Sanborn, Curator of Mammals, and Dr. Hugh C. Cutler, Curator of Economic Botany. Dr. José Cuatrecasas, former Curator of Colombian Botany, is now working at the Museum under the provisions of a Guggenheim fellowship.

STAFF NOTES

Bryan Patterson, Curator of Fossil Mammals, and **Orville L. Gilpin,** Chief Preparator of Fossils, are afield on a paleontological expedition to explore the early Cretaceous Trinity Sands of north-central Texas in continuation of the successful search begun last year for a fossil microfauna.... **Dr. Julian A. Steyermark,** Curator of the Herbarium, recently conducted a botanical field trip in Missouri. ... **Donald Collier,** Curator of South American Ethnology and Archaeology, was a recent speaker before the Chicago chapter of the Archaeological Institute of America. His topic was "Maya Civilization."... **Dr. Alexander Spoehr,** Curator of Oceanic Ethnology, has been awarded a National Research Council grant to complete documentary research in connection with the Museum's Micronesian Anthropological Expedition that he conducted in 1949–50.... The State Department has awarded **George I. Quimby,** Curator of Exhibits in Anthropology, a Fulbright grant to accept an invitation to be visiting lecturer at the University of Oslo, Norway, in 1952. Curator Quimby participated in a conference on Hopewell pottery at the Illinois State Museum, Springfield, April 13–14. **Miss Elaine Bluhm,** Assistant in Archaeology, also took part in the discussions.

THIS MONTH'S COVER

The scene on our cover shows women of an Indian village in the Chicago region about A.D. 1750 husking corn that has been brought from the fields at harvest time. As they do their work, they joke and gossip in housewifely fashion. The picture represents part of one of the miniature dioramas in the new Hall of Woodland and Prairie Indians (Mary D. Sturges Hall—Hall 5). The new hall is described on page 3 in an article by George I. Quimby, Curator of Exhibits in the Department of Anthropology.

Japanese Officials Visit Museum

Three Japanese officials touring the United States to learn American methods of exhibiting and preserving historical materials recently visited Chicago Natural History Museum to observe techniques employed here. They were Dr. Jiro Harada, liaison official, National Museum, Tokyo; Kinji Fujikawa, Chief, Administrative Department, Commission for the Protection of Cultural Properties, Education Ministry, Tokyo; and Jiro Arimitsu, member, Commission for the Protection of Cultural Properties, Education Ministry, Tokyo. Dr. Paul S. Martin, Chief Curator of Anthropology, and his associates were consulted by the members of this party.

New Members

The following persons became Museum Members between March 16 and April 16:

Associate Members

Walter C. Alward, Jr., Miss Frances Jeannette Carter.

Annual Members

Carleton B. Adams, Dr. Cornelius M. Annan, Mrs. Arthur M. Blair, Felix P. Burn, William S. Church, Mrs. Kenneth L. Clark, William S. Deree, James Fentress, Jr., A. J. Frystak, Truman K. Gibson, Jr., George D. Hardin, Mrs. Paul W. Hayes, William E. Hayes, John W. Heddens, Dr. Donald J. Heffner, E. N. Hope, Nye Johnson, Dr. Leonard F. Kowalski, LeRoy Krabill, Dr. Harold Laufman, Irving G. Lederer, Mrs. Josiah O. Low, Mrs. Hugh McCulloch, B. F. McNamara, Harry M. Nacey, Paul M. Nahmens, Mrs. Edwin W. Nelson, Mrs. E. N. Ridley, Joseph H. Schwartz, Leo J. Schwartz, John J. Stahl.

Patrick Henry anticipated modern soil conservation thinking and practice when he said: "He is the greatest patriot who stops the most gullies."

NEW HALL TELLS STORY OF WOODLAND AND PRAIRIE INDIANS

By GEORGE I. QUIMBY
CURATOR OF EXHIBITS, ANTHROPOLOGY

INDIAN CULTURE of the Woodlands and Prairies is illustrated by 59 new exhibits created by the staff of the Museum's Department of Anthropology. They are housed in Mary D. Sturges Hall (Hall 5) on the main floor. The hall is divided evenly between Woodland and Prairie Indians.

The half of the new hall showing Indians of the Woodlands contains the following sections: Indians of the Northern Woodlands, Indians of the Southern Woodlands, Indians of the Eastern Woodlands, and Indians of the Chicago Region of the Central Woodlands.

FARMER-NOMADS

Exhibit contrasting the two phases of the economic life of Eastern Prairie Indians. The Eastern Dakotas are part-time farmers living a sedentary life in permanent villages. They are also part-time nomadic hunters living in tents.

CHICAGO AREA FEATURED

The Indians of the Chicago region were the Illinois, Miami, Potawatomi, Kickapoo, Sauk and Fox, Ottawa, Winnebago, Menomini, and southern Chippewa. Not all of these tribes occupied the area simultaneously, but all of them drifted into or out of the Chicago region in the period after A.D. 1600.

The exhibits in this section of the hall show the distribution of tribes in the Chicago region; the appearance of some of the Indians as portrayed by George Catlin in 1832; the social organization of families, clans, bands, and tribes; types of clothing worn by men and women; types of dwellings; vegetable foods obtained by farming and gathering; preparation of food; and hunting, methods of transportation, games, art, household goods and furnishings, warfare, and religious activities.

The Indians of the Northern Woodlands were the Cree, Algonkin, northern Chippewa, Montagnais-Naskapi, Micmac, and Abnaki. These Indians made their living by hunting, fishing, and the gathering of wild foods. The exhibits in this section show the area occupied by these Indians, their dwellings, household goods, clothing, mode of subsistence, tools, weapons, and utensils, social organization, forms of marriage, family, kinship, and inheritance, and religion.

The Iroquois tribes—Seneca, Oneida, Cayuga, Onondaga, and Mohawk—are used in the new hall to illustrate the culture type of the Eastern Woodlands. These Indians lived primarily by farming, but they supplemented their agricultural products by hunting and gathering. Their houses, made of a framework of poles covered with bark, were very large and contained apartments for a number of families, the women of which were close relatives. The Iroquois tribes were joined in a confederacy called the League of the Iroquois. This confederacy established rules and regulations for handling strife among the Iroquois tribes and thus prevented warfare between them.

The exhibits dealing with the Iroquois show their houses, households, household goods, art, and religious paraphernalia. Of particular interest is a display of carved wooden masks worn by members of the False Face Society, a religious group devoted to healing the sick.

Among the many tribes of the Southern Woodlands were such groups as the Creek, Caddo, Cherokee, Catawba, Choctaw, Seminole, and Chitamacha. The culture type of the Southern Woodlands was characterized by large villages, an agricultural economy, and a somewhat elaborate social organization that emphasized class systems. The exhibits in this section illustrate clothing, art, tools, weapons, and utensils of various southern tribes.

INDIANS OF THE PRAIRIES

The half of the new hall showing Indians of the Prairies contains the following sections: Indians of the Eastern Prairies, Indians of the Western Prairies, and Indians of the Southern Prairies.

The Indians of the Eastern Prairies were the Iowa and the Eastern Dakota. They were farmers and hunters. Part of each year they were sedentary farmers dwelling in villages of bark-covered houses. The rest of the year, particularly in midsummer, they were nomadic hunters of buffalo. Exhibits illustrating the culture of the Indians of the Eastern Prairies show their dwellings, mode of livelihood, clothing, and art.

The Indians of the Western Prairies were the Pawnee, the Omaha, the Ponca, the Oto, the Mandan, the Hidatsa, and the Arikara. The exhibits show the distribution of these tribes, the physical appearance of some of the Indians as portrayed by George Catlin in 1832, the houses and households, household goods, farming implements, hunting weapons, tools and utensils, clothing, art, games, warfare, and religious practices. One exhibit in this section illustrates the Pawnee ideas of heaven, another shows the sacred medicine bundles and other religious paraphernalia, and others illustrate sacred rituals and sacrifices.

CEREMONIAL CLOTHING

Exhibit from Pawnee Indians of the Western Prairies.

The Indians of the Southern Prairies were the Kansa, Missouri, Osage, and Wichita.

(*Continued on page 5, column 1*)

COLONIES OF ILLINOIS BATS INVADED BY BUSINESS

By COLIN CAMPBELL SANBORN
CURATOR OF MAMMALS

From the war clouds on the horizon there comes to our ears the thunderous threat of various types of alphabet bombs. Far-sighted businessmen, in making plans for this eventuality, are quietly looking about for underground storage rooms where records and files can be safely stored outside the area of strategic targets.

Courtesy Acme Newspictures

WINTERING BATS IN ABANDONED ILLINOIS MINE

In an old limestone mine near the town of La Salle about 5,000 bats were found hibernating. Owners of the mine plan to use it as a vault for vital papers in case of atomic war.

The American Record Storage and Depository Company of Chicago selected an old limestone mine near La Salle, Illinois, for the development of a bomb-proof storage shelter. This old mine, unworked for fifty years, was used to hide a still during the "Dry Era" and was tried unsuccessfully as a mushroom garden, but otherwise it had not been of financial value.

THOUSANDS OF BATS

The company was surprised to find the mine inhabited, however, by some thousands of bats quietly roosting on the walls and ceiling until spring arrived to arouse them from their frigid sleep and to send them forth to other caves or abandoned mines where the phenomenon of producing and raising more bats would take place. Unfortunately, development and construction work necessitated the removal of some numbers of these bats, which were offered to various institutions and biological supply houses in the city, including Chicago Natural History Museum.

Although the Museum has an adequate representation of the local bats, the staff of the Division of Mammals is always interested in examining colonies of bats and in identifying the species as a matter of record. Melvin Kahn, president of the company, generously granted permission to visit the mine and arranged to have its agent in La Salle act as guide.

So it happened that on the morning of March 19, with the thermometer at 18 degrees and flurries of snow in the air, this Curator, accompanied by Rupert L. Wenzel, Curator of Insects, drove south to examine the bat colony. In spite of the cold the first hardy bird migrants were making valiant efforts to sing, and snatches of song from robins, song sparrows, and red-winged blackbirds reached us faintly now and then on the frigid wind.

PARASITES STUDIED

The interest of Curator Wenzel lay not in the bats themselves so much as in the parasites that live on, and only on, the bats and that do not transfer themselves to human beings. In this northern area these consist of mites, fleas, and bat "bedbugs." These latter live in the cracks in the walls of roosting places and come out when hungry to have a meal of blood from the nearest bat.

Our indoctrination and introduction to the mine was given us by Roy Phlak, the architect for the company, who showed us plans of the mine workings and then guided us to and through the mine. He left us then to our own bat-hunting methods, with a promise to bring a search party if we did not return to La Salle by a certain fixed hour.

The mine, dug into the side of a hill, was comprised of an upper and a lower level. In the upper level the ceiling was low. There were many entrances admitting more light and cold air than desirable in bats' winter bedrooms and so this level was uninhabited.

HANG IN CLUSTERS

The lower level was roughly one large room about 500 feet square, with many halls and their connecting passageways leading away from the one open entrance. It was warm, about 50 degrees, dark, fairly dry, and apparently most acceptable to the bats. We found them in clusters of from two to fifty hanging from ledges on the ceiling or against the walls. Others were solitary, seemingly not needing the companionship or the heat of their kind. Many old drill holes, made for blasting when the mine was in operation, were also occupied by the bats. In some they hung from the top of the hole and in others they lay piled one on top of another helter-skelter, as though, when tired of hanging, they had fallen in a heap. In all, it was roughly estimated that there were about 5,000 bats in the mine.

A careful examination of these clusters and solitary individuals showed that there were four species of bats in the colony. The big brown bat (*Eptesicus fuscus*), represented by not more than a dozen individuals, hung rather low on the walls, not more than three feet from the floor. The pipistrelle (*Pipistrellus subflavus*) was found in small numbers in one hall well back from the entrance. Its reddish color and small size at once identified it. The majority of the bats were the little brown bat (*Myotis lucifugus*), and they occupied spots on the ceiling and the walls in all parts of the cave. The moisture on them, reflected in the rays of our electric lanterns, gave them a varicolored appearance so that some looked white and others almost black. Brought into daylight, however, with the drops of water shaken off, they were all the same color.

Among the little brown bats were some that seemed to have much larger and broader ears and were more yellowish on the underparts than the others. These proved to be Trouessart's long-eared bat (*Myotis keenii*

septentrionalis), whose range includes almost all of the eastern half of the United States. We were very glad to find it because there are only three previous records of its occurrence in Illinois. It was present in small numbers, scattered here and there throughout the mine.

We brought home twenty bats representing the four species and these Curator Wenzel examined microscopically for parasites. He found on the little brown bat three specimens of a flea (*Modopsylla insignis*) hitherto poorly represented in the Museum collection and two or three species of mites. No "bedbugs" were found in the cave and none on the bats, but this was not surprising as they are not very active during cold weather.

This colony of bats is the largest known close to Chicago. The mine did not appear to be used as a breeding place during the summer, but it is possible a few bats might be found in it then. How long the bats have used the mine cannot be estimated. It is to be hoped that all their retreats will not be taken from them because bats are important in the destruction of noxious insects.

The effects of the policy of Moscow reach even into the underground roosting places of bats!

NEW INDIAN HALL—

(Continued from page 3)

These Indians, who made their living by farming and by hunting the buffalo, lived in houses made of poles that were covered with reed mats or grass thatching. The exhibits in this section show their house types, household goods, tools and utensils, clothing, art, and warfare.

Two general exhibits are displayed in the new hall. One shows the Asiatic origin of the Indians, their spread in America, and the various culture areas that had been established by the time of discovery. The other deals with the modification of Indian culture brought about by contact with the culture of the White men.

DISPLAYED IN MODERN MANNER

The new hall is well lighted and the newest exhibition techniques have been employed. Each exhibition case has individual illumination so that the complete contents are easily seen, and every effort has been made to add to the attractiveness of the exhibits. The upright floor cases have been painted a neutral gray color and are placed back to back in order to make a compound case 4 feet wide, 12 feet long, and 7 feet high. Each half of such a compound case provides an exhibition space about 12 feet long, 7 feet high, and 2 feet wide. For protection against damage by moths and other insects, each floor-case is equipped with a built-in fumigating tank that can be serviced without opening the case. Hanging wall-cases along one side of the hall are 4 feet high, 6 feet long, and one foot wide. Other cases of varied sizes contain miniature dioramas.

The story of the Indians of the Woodlands and Prairies is told in terms of dioramas, idea-exhibits, and arrangement of selected specimens in carefully planned categories. In general, the idea-exhibits provide a social context for exhibits of specimens by category, and the dioramas illustrate ideas and activities that would be extremely difficult or impossible to convey by specimens alone. Various tones of green have been used as background colors for the exhibits of the Indians of the Woodlands and shades of yellow for the Indians of the Prairies. Throughout the hall there has been an effort to avoid overcrowding within the cases.

MAPS AID VISITORS

Labels are brief and composed of cut-out letters, except for a general label that is printed and framed. With each general label there is an accompanying map showing location or distribution of the Indians represented.

Clothing is displayed on manikins of papier-mache. These manikins are featureless and stylized so that attention is focused on the clothing. The old-style manikins were poor substitutes for reality and frequently drew attention to such a degree that the observer did not notice the clothing, which, after all, was the point of the exhibit.

The exhibits in the new hall were planned by the curatorial staff of the Department of Anthropology and executed by Artist Gustaf Dalstrom. The installations were undertaken by Preparator Walter C. Reese. Dioramist Alfred Lee Rowell is responsible for the dioramas, and Ceramic Restorer John Pletinckx made the manikins.

WORK OF ART STUDENTS IN SPECIAL EXHIBIT

Drawings of mammals, birds, and other subjects displayed in this Museum form a special exhibit by students in the Junior School of the Art Institute of Chicago that will be held in Stanley Field Hall from May 1 to 31, inclusive. The students represented are those whose classes meet periodically in this Museum for special work on nature in art and design. Two members of the Natural History Museum staff, Gustaf Dalstrom, Artist in the Department of Anthropology, and Douglas E. Tibbitts, Staff Illustrator, made the selections for the exhibit. Mrs. C. S. Howlett, Head of the Junior School, co-operated in judging the work. The exhibit includes productions both of the classes for students from 10 to 17 years of age and of the general drawing classes for first-year students from 18 to 40 years of age.

FIFTY YEARS AGO AT THE MUSEUM

Compiled by MARGARET J. BAUER

Working of the dinosaur quarries in Colorado, which were discovered and partially exploited in 1900, was continued during several months of the summer of 1901 by a party under the direction of Assistant Curator Elmer S. Riggs. The work involved considerable blasting, tunneling, and the construction of a temporary ferry.

Drilling to blast dinosaur quarry

The number of expeditions in the field in 1901 outnumbered those sent out in any previous year. Listed below are the men in charge and the places they visited:

Anthropology: W. A. Phillips, to southern Illinois; Stephen C. Simms, to Arizona and California; J. W. Hudson, to California; Charles L. Owen, to Arizona; George A. Dorsey, to Oklahoma and Arizona; Merton L. Miller, to Columbia River Basin; and C. F. Newcombe, to Queen Charlotte Islands, British Columbia.

Botany: Charles F. Millspaugh, to Jamaica.

Geology: Elmer S. Riggs, to western Colorado.

Zoology: S. E. Meek and F. E. Lutz, to central Mexico.

Southwest Botanical Expedition

On May 20 the Museum's 1951 Southwest Botanical Field Trip, conducted by Dr. Hugh C. Cutler, Curator of Economic Botany, will leave for six weeks of field work in New Mexico and adjacent Arizona. Most of the time will be spent in west-central New Mexico studying the vegetation growing about sites such as Tularosa Cave, which was excavated by the Museum's 1950 Southwest Archaeological Expedition.

BIRDS OF A GARDEN IN SAN SALVADOR

By AUSTIN L. RAND*
CURATOR OF BIRDS

My son Stanley and I live in a guest house called Villa Margarita. It is No. 3, Colonia America, above the city of San Salvador and across the city from the Tropical Institute where we spend our days studying birds. The altitude, about 2,300 feet, is great enough to ameliorate the midday heat, if not the brightness, and the mornings are pleasantly chilly.

Though we sleep under blankets and are glad to pull them up under our chins, one

ENTRANCE TO VILLA MARGARITA

From here the members of the Museum's project travel daily to their research laboratories at the Instituto Tropical de Investigaciones Cientificas of El Salvador. Pboto by Sharat K. Roy, Chief Curator of Geology and a member of the project.

glance at the garden in which our spacious house is set would tell you it was in the tropics. The house, of stuccoed brick and tile, has its entrance heavily draped with orange-flowered trumpet vines. Two low fan-palms flank the steps; red-flowered hibiscus and crotons with gay leaves line the circular drive. There are orange and lime trees beyond, and two araucarias (imported from the Australian region) and two feathery palms, one draped with a white-flowered vine, stand beside the garden exit. A group of long-leafed pines, similar to those that grow higher in the mountains, is in one corner. Hedges on each side of the garden, one of them of bamboo, insure privacy. There is a red-flowered pito tree. Purple-flowered *Bougainvillea* drapes pines and hedges. Against this vivid tropical color, constant watering has kept a green lawn, and beds of roses and zinnias struggle valiantly but wanly under these alien skies.

*Dr. Rand is a member of the current Salvadorean Project, a joint research activity of this Museum and the Instituto Tropical de Investigaciones Cientificas, El Salvador.

ZOO LIONS ROAR

Beyond our hedges we see a corner of a native mud hut, mango and paw-paw trees, and a lonely coconut palm that raises its head against the sky. Across the road the roof of the fort shows; below it is the house of the president of El Salvador, the national museum, and the zoological garden, from which last, at night, we hear the roar of lions. Beyond, across the city, rises the impressive bulk of the Volcano of San Salvador, usually blue-gray now in the heat haze of the dry season.

We notice other visitors from the north spending the winter here. An olive-sided flycatcher that was perhaps hatched in Canada perches in one of the pines. Except for being silent it looks quite at home. Baltimore and orchard orioles visit the flower trees; yellow warblers flit through trees and shrubbery, gleaning for insects; flocks of cedar waxwings, demure and quiet as always, perch in our trees in passing; and dull-colored little flycatchers that might be least flycatchers or wood pewees sit up without giving a call note as a clue to their identity. And silent, small, grayish-olive flycatchers are hard to identify, not only when alive but even when they are museum specimens.

MEET FEATHERED NATIVES

But having acknowledged the winter visitors, we'll go on to what really interests us, the natives. Our first morning in San Salvador we were awakened by a three-note, thrush-like song that we quickly came to associate with dawn and dusk. Its author, we found, was a thrush that, except for its dusky color, would pass for an American robin, with the same size and shape, the same way of sitting, hopping, and flitting its tail. But it was a bird of the dark places. It never came out on the lawn but delighted in haunting the ground in shady nooks and corners, indicating perhaps that before it became a garden bird it lived in the forest. A late riser but a noisier and more persistent songster is the white-bellied wren. These wrens are always in parties, and a party includes our garden in its beat. They leave no cranny unexplored, hopping about through the shrubbery, on the ground, and on tree trunks (one that I saw exploring a hole in a tree forty feet up I at first mistook for a woodpecker). They don't neglect the house, either, and go poking about the tiles and the crevices of downspouts, looking for their insect food. One bird will start singing several rollicking liquid notes that are repeated over and over, and other birds of the party will join in until we have a pleasing medley that fills the garden. They are typical wrens in behavior, hopping about with tail cocked up, but they are large for wrens, larger than an English sparrow, and as such less fussily nervous and jumpy than many of their smaller relatives.

The great-tailed grackles, not unlike our bronze grackle but with much longer tails, are the noisiest if not the most musical of our garden birds. The male, all black with a contrasting white eye, displays with fluffed-up feathers and a squealing whistle or a chirping chuckle; the female, more brownish in color, answers with a chatter and a flickering of wings. And at all hours of the day their whistles, squeals, chirps, and chatterings burst out.

MYSTERIES TO SOLVE

We usually associate nest-building with the breeding season. But the white-bellied wrens I've mentioned carry on nest-building throughout the year, even though they nest during only a short season. Right now, one party of six or so is building two nests in a fan-palm by our door, and by watching them I hope to unravel some of their mysteries. Though it's still the dry season some birds have begun nesting, perhaps influenced by the greenery and the watering

VILLA MARGARITA GARDEN SCENE

This is the setting in which the members of the Museum's Salvadorean Project are housed in San Salvador. Photo by Sharat K. Roy, Chief Curator of Geology and a member of the project.

in our garden. A pair of kis-ka-dee flycatchers, bold brown and yellow birds with conspicuous eye-stripes and about the size of a kingbird, are building in one of the araucarias on our drive. The call of the querelons, from which they get their name,

bursts out periodically, at any time of day, especially when a neighboring pair visits them. Several female grackles are carrying grass for nests into feather-palms and mango trees. A pair of yellow-billed blue pigeons sit side by side, the male cooing as it rocks deeply back and forth; then the pair peck fondly at each other's heads and necks and finally visit a certain branch on the other araucaria, where I hope they will place their nest.

The flowers, of course, attract many birds. Hummingbirds dart in and out, though as yet I have not identified these vivid-emerald living jewels, and I don't know how many kinds there are. The red-flowered pito tree is the favorite of the Baltimore oriole and of another black-and-orange oriole that is resident. They feed by plucking a bloom, holding it under one foot, pecking a hole in the base, poking there for a moment, perhaps for nectar, and then letting it drop and picking another flower. A big dull-colored sparrow with white eyebrows and a white stripe in its throat is also fond of these flowers, but it feeds in quite a different way. It picks the flowers and swallows them, after some manipulation in its bill.

It is not birds alone that eat these blooms. Through the country one sees the local people climbing into pito trees or breaking off the blooms with poles. These blooms, I'm told, are used in flavoring their frijoles. I've tasted pito blooms and find them much like green beans. The bottle-brush tree next to the pito tree is favored by a different class of birds that feed in a different manner. They poke into the blooms for insects or nectar. The chestnut-and-black orchard oriole is one of the most persistent visitors; it tries to drive out the other species so that it can keep the whole tree to itself. But little green warblers also swarm there. Most surprising to me is that the white-bellied wrens can turn into flower-birds. Clinging right side up or head down, they compete with the orioles in feeding at the blooms.

These are some of the thirty or more birds I've seen in our garden. Others include two tanagers that come occasionally, a little dove that walks our drives and coos from our shrubbery, swallows and swifts that fly overhead, and, toward evening, screeching flocks of parrots that pass on swiftly beating wings.

VULTURES ALWAYS PRESENT

Vultures, strictly speaking, are not garden birds. But no El Salvador scene is complete without them. In the mornings when they're sailing low, looking for breakfast, their shadows cross and re-cross our lawn. No doubt they would come down if there was food, for we see them on main streets and perched in yards of the houses in the poorer parts of town, playing their role of scavengers.

There are other interesting things in our garden besides birds. There are lines of parasol ants carrying bits of leaves to their homes. There's a crested climbing lizard more than a foot long that lives in our hedges and a small gecko-like lizard with a brown head that lives in our garage. One night a rustling in a feather-palm made us shine a light there to find a beautiful, bright-tawny, big-eyed and big-eared mouse that climbed up into our trumpet vine and disappeared. There are a few yellow buttlerflies, but so far not many, and none of the big, brilliant, blue ones that I've seen in the country.

It's still the dry season. Not a drop of rain has fallen in the month we've been here. At midday it's intolerably bright, but clouds are coming up today from the low country. The other night we smelled rain. Soon the wet season will start and then, I expect, we'll find that our garden, its inhabitants, and its visitors will change with the season.

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the past month:

Department of Anthropology:

From Mrs. Fred L. Starbuck, Northbrook, Ill.—a copper spearhead.

Department of Botany:

From: Dr. Margery Carlson, Evanston, Ill.—51 cryptogams, southern Mexico; Dr. E. C. Cocke, Wake Forest, N.C.—3 algae, Carolinas; Dr. Violet M. Diller, Cincinnati—20 algal cultures, Cincinnati; Dr. Sidney F. Glassman, Chicago—23 cryptogams, Caroline Islands; Albert Greenberg, Tampa, Fla.—a Cryptocoryne Griffithii in flower, Florida; Ray Grow and Simon Segal, Chicago—a Lycopodium, Indiana; Dr. Faustino Miranda, Mexico City—6 plants (isotypes), Mexico; Dr. Reuben Lasker, Coral Gables, Fla.—3 algae, Gulf Stream, Florida; Linda Newton, London, England—2 algae, Anglesey Island, England; Oregon Wood Chemical Co., Springfield, Ore.—a sample of raw Douglas-fir wax, Oregon; V. W. Proctor, Columbia, Mo.—2 algae, Boone County, Missouri; Dr. Albert Saeger, Kansas City, Mo.—a Chlorochytrium, Missouri; Dr. E. E. Sherff, Chicago—119 negatives and 23 descriptions, Hawaii and Mexico; F. A. Swink, Chicago—2 plant specimens, Illinois; F. A. Swink and A. S. Rouffa, Chicago—a Trillium nivale, Illinois; Dr. L. O. Williams, Tegucigalpa, Honduras—a Pinus caribaea and 3 plant specimens, Honduras; Instituto Agronomico do Norte, Belem, Pará, Brazil—4 phanerogams, Brazil.

Department of Zoology:

From: Department of Zoology, University of Arkansas, Fayetteville—2 bats, Arkansas; Arkansas Game and Fish Commission, Little Rock—2 wolves, Arkansas; Theodore F. Beimler, Brownsville, Tex.—a snake, Texas; Chicago Zoological Society, Brookfield, Ill.—a bird skin (cage bird) and a mammal, Cuba; Harold A. Dundee, Lawrence, Kan.—4 salamanders, Arkansas; Rev. Brother Hermano Daniel, Medellín, Colombia—35 frogs, 4 lizards, and 13 snakes, Colombia; F. Gaerdes, Okahandja, Southwest Africa—250 moths and butterflies and 35 beetles, Southwest Africa; Joseph La Pointe, Harvey, Ill.—2 salamanders, Indiana; Lewis E. Long, Bluefield, Nicaragua—300 insects, Nicaragua; R. H. Ness, Tower Lake, Ill.—a mammal, Lake County, Illinois; A. J. Nicholson, Billings, Mont.—20 batflies, New Caledonia; Peabody Museum Near East Expedition, 1950—a collection of marine and land shells, Near East.

Motion Pictures:

Indiana University, Division of Adult Education, Bloomington—2 16mm color sound-films.

Library:

From: Dr. Walter Briese, Santiago, Chile; Mrs. Hedwig Mueller, Chicago.

MAY GUIDE LECTURE TOURS, DAILY EXCEPT SUNDAY

Tours of exhibits, under the guidance of staff lecturers, are conducted every afternoon at 2 o'clock, except Sundays and certain holidays. On Mondays, Tuesdays, Thursdays, and Saturdays, general tours are given covering all departments. Special subjects are offered on Wednesdays and Fridays. A schedule of these follows:

Wed., May 2—Bag and Baggage—Travel Kits from Primitive Lands (*Harriet Smith*).

Fri., May 4—Baby Animals. Illustrated introduction in Meeting Room (*Lorain Farmer*).

Wed., May 9—Indians of Prairies and Woodlands (*June Buchwald*).

Fri., May 11—The Flowers that Bloom in the Spring. Illustrated introduction in Meeting Room (*Marie Svoboda*).

Wed., May 16—A Spring Walk in the Woods (*Miriam Wood*).

Fri., May 18—Our Migratory Birds. Illustrated introduction in Meeting Room (*Jane Sharpe*).

Wed., May 23—"There's No Place Like Home"—Housing Through the Ages (*Marie Svoboda*).

Fri., May 25—The Roaming Romans—Ancient Rome and Her Empire. Illustrated introduction in Meeting Room (*Anne Stromquist*).

Wed., May 30—*No tour.* Memorial Day holiday. Museum open as usual, 9 A.M. to 6 P.M.

The development of Egyptian civilization from before the tenth dynasty (about 2200 B.C.) to the Roman period (about A.D. 200) is shown in Hall J.

'SECOND-HAND' BUILDING BY SEA DWELLERS

By EUGENE S. RICHARDSON, Jr.
CURATOR OF FOSSIL INVERTEBRATES

IN THESE DAYS of shortages and impending shortages we don't sneer at anyone who uses second-hand lumber, pipes, or shingles to build his house. We wish we had some, too. But we can't help remarking his similarity to certain invertebrates, both living and fossil, that have been found to build their houses the same way. The practice of our old friend, the hermit crab, of taking over an abandoned whelk shell is a different sort of real-estate operation altogether. He's just buying an old house, probably with a mortgage on it.

Figure 1

Among the simplest animals, the single-celled Protozoa, are the Foraminifera, very common as fossils though microscopic in size. Most of them build shells that look rather like tiny snail or nautilus shells, very beautiful productions indeed when examined

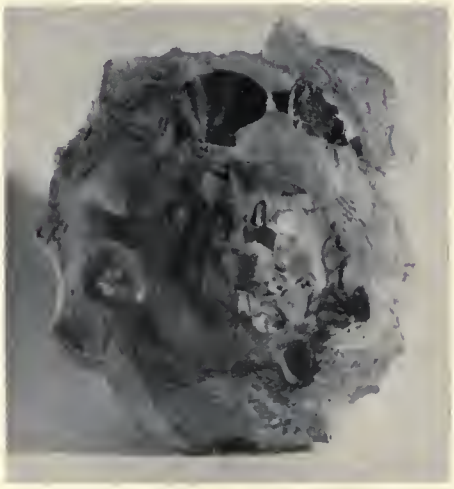

Figure 2

under the microscope. But some of the Foraminifera, and we can't call them either lazier or smarter than the rest, build their protective coats of materials picked up from that best-stocked of all junk yards, the floor of the ocean.

Usually the sea floor in any limited area is covered with a limited assortment of materials: angular large quartz grains, round small quartz grains, partly rounded feldspar grains, or similar objects, dominantly of a single variety. Most of the borrowing Foraminifera pick these up as they glide along the bottom, fastening one here, one there, on their soft unprotected bodies as needed. It is remarkable that this type of construction results in a perfectly definite and recognizable shape of integument for each of the many species practicing it. Other borrowing Foraminifera select only grains of a given color from among thousands of grains of slightly different hues. Others, with infinite pains, delve about over a wide area, selecting only the rare flakes of mica sparsely scattered among the sand grains or the still rarer spicules (tiny stiffening rods) remaining from dead and dissipated sponges. The material used and the shape of the resulting "shell" are in each case reliable means of identifying the species.

Most of the higher forms of shell-building sea animals use only mineral substances chemically removed from the sea water, as do the normal shell-building Foraminifera. Their shells are principally composed of calcium carbonate ("lime"). But in even such a relatively advanced group as the sea-snails, there are some that patronize the "second-hand market." The Museum possesses some shells of *Xenophora crispi*, from the Quaternary deposits of Palermo, Sicily. Although the shells are built almost entirely of lime, they are ornamented with regularly placed fragments of rock, broken shells, and even whole shells of small scallops, clams, and snails. When one of these is dislodged, a perfect impression of it remains in the limy shell, as an impression of a removed ornament would remain in the cement of a fancy gatepost. The name of this decoratively inclined snail, translated from the high-sounding scientific language, means *Crisp's* (in Latin) *foreigner-bearer* (in Greek). As usual the scientific name turns out to have been well devised to provide a brief description as well as a name.

With a history of the re-use of building materials extending back to an antiquity antedating man himself, no one need blush for using whatever he can get when he finds himself with a house to be built.

KEY TO FIGURES

Figure 1: Textularia smithvillensis, a foraminifer from an Eocene sand deposited 25 million years ago. It built its "shell" of sand grains. Model by Artist Joseph B. Krstolich for a new exhibit in Frederick J. V. Skiff Hall (Hall 37).

Figure 2: Xenophora crispi, a sea snail that ornamented its shell with carefully chosen rock and shell fragments. Many of the decorative pieces have fallen off.

Learn from the birds what food the thickets yield.
Learn from the beasts the physic of the field,
The art of building from the bee receive,
Learn of the mole to plow, the worm to weave. —POPE

MUSEUM RADIO PROGRAMS, SATURDAY AFTERNOONS

Through the courtesy of the American Broadcasting Company, Chicago Natural History Museum is on the air each Saturday afternoon at 4:30 P.M. over station WENR in Chicago (and at 2:30 P.M. on the coast-to-coast network of ABC) in a new program entitled "Exhibit A."

On this program members of the Museum's scientific staff are interviewed in the Museum exhibition halls, where they relate many things about outstanding exhibits that would not be apparent to most Museum visitors—how the material was collected in the field, how it was prepared for exhibition—and give details of natural history that cannot be told within the limited space of exhibition labels. To date, those who have appeared on the program include John R. Millar, Deputy Director of the Museum; Karl P. Schmidt, Chief Curator of Zoology; Dr. Paul S. Martin, Chief Curator of Anthropology; Bryan Patterson, Curator of Fossil Mammals; and, in a program about the preparation of the famous gorilla Bushman, D. Dwight Davis, Curator of Vertebrate Anatomy, Taxidermist Leon L. Walters, and Joseph B. Krstolich, Artist in Zoology.

Scheduled for appearances in the near future are Dr. Theodor Just, Chief Curator of Botany, Loren P. Woods, Curator of Fishes, and Robert K. Wyant, Curator of Economic Geology. Other museums participating in the program are the Art Institute of Chicago, Museum of Science and Industry, Chicago Historical Society, and Adler Planetarium.

Botanical Collectors Back From Florida

The Botanical Field Trip to Florida conducted by Emil Sella, Curator of Exhibits, and Samuel H. Grove, Jr., Artist-Preparator, has completed its work and returned to the Museum with a large collection of flowering plants. Included are species native to Florida and species introduced from tropical countries. In a little less than five weeks the expedition covered a large part of the state, including the Everglades, Lake Okeechobee, the Miami area, and Key West. Studies were made at two experimental gardens maintained by the United States government.

Museum Pensioner Dies

John Anderson, employed as a carpenter in the Department of Anthropology and in the Division of Maintenance from 1920 until his retirement on pension in 1942, died April 7. Mr. Anderson was born in Sweden in 1869.

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Chicago Natural History Museum

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

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THE BULLETIN

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ABOUT OUR COVER—

TOO MANY VACATIONISTS who spend their summers in the north woods the loon and its eerie, laughing cry are the personification of the Canadian wilderness. Rivers and lakes of the northern coniferous belt are its preferred habitat during the warmer months. However, breeding pairs also occur southward to the northern portion of this country, as shown in the Michigan summer scene on this month's BULLETIN cover. The illustration represents part of a habitat group in Hall 20.

Loons are beautifully adapted to their aquatic habitat and seldom leave it except during migration when cross-country flights are necessary. Their legs, placed near the rear of the body, are virtually useless for walking.

* * *

WHEN ON LAND the bird hobbles with much difficulty, using its wings as crutches and even its bill to assist its movements. Little wonder that it spends most of its life in the more appropriate element and even builds its nest at the water's edge, preferably on an island.

How different the picture when the loon is afloat! Probably no bird excels the loon in swimming and diving, a reputation that is well established but often challenged by incredulous canoeists.

* * *

LOONS PREY largely on fish, which are captured with apparent ease, and luckless loons have been snared on set hooks as much as 90 feet below the water's surface.

However inept and ridiculous on land, the loon probably will be remembered with nostalgia by all who associate burgeoning spring and luxuriant summer with forest-bordered northern lakes.

EMMET R. BLAKE
Associate Curator of Birds

ARCHAEOLOGISTS TO DIG IN CAVES OF SOUTHWEST

BY PAUL S. MARTIN
CHIEF CURATOR, DEPARTMENT OF ANTHROPOLOGY

In June, the Museum's seventeenth Southwest Archaeological Expedition will leave for western New Mexico to continue excavations in caves in Pine Lawn Valley. The success of the cave excavations of the preceding season was so dramatic that further research in a cave is imperative.

Digging in a cave is far from pleasant. The dust and heat are oppressive; and the wearing of masks and goggles—an uncomfortable and trying experience—is absolutely necessary to give protection from toxic, nuisance, and pneumonoconiosis-producing dusts. Added to these discomforts is another—inadequate ventilation. The caves that we excavated in 1950 and the one to be done in 1951 are small—about 40 feet deep by 30 feet wide at the mouth and 6 feet or less high. At the end of a day, the workers look as if they had been working in soft-coal mines.

Many have wondered why we did not use a large electric fan for ventilating the cave and large flood lamps for lighting. The answer is simple: no "juice."

ISOLATION A PROTECTION

Fortunately for us, these caves are usually far removed from roads and trails and high-tension electric lines. I say "fortunately for us" because if the caves were easy of access they would have been stripped and pilfered long ago by vandals. But since we have to take the good with the bad in all phases of life, we accept the fact that a "good" (that is, undisturbed) cave is never near an electric power line. Hence, good lighting and ventilation are beyond our reach. A portable generator might be used, but the expense of one is prohibitive; and the problem of transporting one to or near the cave would be difficult if not impossible. Therefore we get along without forced ventilation, and for illumination we use portable, chargeable, wet-battery electric lamps.

The results of last summer's dig were noteworthy for several reasons. Readers of the BULLETIN may recall that the expedition returned with more than 1,000 perishable objects—such as clothing, sandals, weapons, ornaments, basketry, agricultural tools, fire-making equipment, rope, snares, netting, and miscellaneous wooden objects. These materials are dubbed "perishable" because they would have turned to dust if they had not been dug from a "bone-dry" cave. Such specimens are unique because they are the first to be recognized as part of the Mogollon culture (a "new" culture that the Museum has been investigating for seven seasons) and the first to have been carefully removed under scientifically controlled conditions and therefore documented as to place in the cave and as to chronological order or dating.

ANTEDATE ANASAZI

The second remarkable thing about the materials recovered by the 1950 expedition is that although many of the objects are similar to those found in caves of the Cliff-Dweller or Anasazi culture, our specimens are *earlier* (that is, older) than Anasazi (Basket-Maker–Cliff-Dweller) objects.

The third noteworthy observation about our perishable materials is that from them (by the carbon-14 or radiocarbon method of dating, described by Curator Donald Collier in the BULLETIN of January, 1951) we have obtained the information that our plain brown pottery is the earliest dated pottery (as of now) in the Southwest and that it was manufactured shortly before the beginning of the Christian era.

The fourth remarkable fact about our 1950 materials is that we uncovered more than 38,000 corn cobs (all of which were shipped to the Museum for intensive study by Dr. Hugh C. Cutler of the Department of Botany), plus many other vegetable products, such as beans, gourds, squash, and wild foods. This is the largest collection of archaeological foods covering an extensive period of time that has ever been brought together. In the bushels of corn, Dr. Cutler found the earliest and most primitive corn that has come to light up to the present time. The age of this corn has not yet been determined, but we guess that it will prove to be about 2,000 or 2,500 years old.

MORE SPECIMENS REQUIRED

Although we recovered a large quantity of unique materials, we need many, many more. For one thing, we have no objects from several important periods (A.D. 500–700 and A.D. 900–1300). Therefore we lack a complete sequence. Second, we have only one or two items of particular classes or categories of objects. For example, we found only one fire drill, one complete bow, one gee-string, only portions of spear-throwers, portions of darts, and incomplete pieces of other objects.

Naturally, it is impossible to make any generalizations on the basis of one specimen or an incomplete one. Therefore, one of the prime goals of the 1951 expedition is to augment the 1950 collection, to fill out recognized gaps, and to try to find new classes or kinds of materials.

Members are requested to inform the Museum promptly of changes of address.

CHICAGO AMATEUR GEM CRAFTSMEN DISPLAY THEIR CREATIONS

A notable display of gems and jewelry prepared by Chicago amateur craftsmen will be open to the public in Stanley Field Hall of the Museum from June 1 to 30, inclusive. The exhibit, sponsored by the Chicago Lapidary Club, consists of the prize-winning creations entered in that organization's First Annual Amateur Handcrafted Gem and Jewelry Competitive Exhibition. Total value of the exhibited objects is approximately $150,000.

Objects in the exhibit range from granite pebbles picked up on Chicago beaches and polished into ornamental stones of the highest beauty to precious stones valued in the thousands of dollars. More than 150 amateur craftsmen of Chicago and suburbs participated in the contest. The exhibit represents the best of their work in gem cutting and in the fabrication of brooches, rings, bracelets, necklaces, pendants, tie-clasps, and other jewelry. In their creations the contestants used more than a hundred different kinds of precious and semiprecious stones and gem materials as well as silver and gold. Among the contestants were members of three Chicago lapidary clubs and of classes in lapidary work conducted in five field houses of the Chicago Park District, as well as many persons unattached to any organization.

WOMEN IN TOP RANKS

The contestants represent many and widely varied walks in life. The number of women participating was about equal to the number of men, and their enthusiasm and skill equaled that of the men, according to J. L. Cunningham, chairman of the General Exhibition Committee. It was a woman—Selma Jenner—who spent months searching Chicago's beaches for granite pebbles, which she cut and polished into attractive objects d'art, and so diligently did she pursue this hobby that her entry in the contest, filling nine large boxes, numbered more than 700 specimens. Another contestant—one who specialized in the fabricating of jewelry pieces—was Mrs. Florence Kibbler Renaker, an instructor in the American Academy of Art, who last year gained wide fame for another exploit of an altogether different nature when, alone, she traveled on a rubber raft the length of the Colorado River and through the Grand Canyon.

The contestants were classified into three groups: novice, intermediate, and advanced lapidary and jewelry craftsmen. The contest and exhibits include nine divisions: (1) individual gems; (2) specific gem collections; (3) general gem collections; (4) polished slab collections; (5) polished specimen collections; (6) individual jewelry; (7) jewelry sets; (8) jewelry collections; and (9) special pieces. Because of this broad range, the ribbons, gold cups, and other trophies awarded reached a total of 98. The prize-winning entries, including multiple collections comprising many pieces, bring the exhibit as presented at the Museum up to several hundred specimens. The enthusiasm with which these craftsmen engage in their hobby is illustrated by Chairman Cunningham himself, whose entries totaled 23, one of which alone included 250 cut and polished opals, with a value running into thousands of dollars.

PLAN ANNUAL EVENT

This year's exhibit represents the beginning of an ambitious program by the Chicago Lapidary Club. It is proposed to continue these events each year, on an ever-growing scale that eventually may include craftsmen from all over the Middle West. It is also planned to continue annually at the Museum the thirty-day display of the results. Even this year, with only two months of promotion, interest was stimulated far outside the Chicago area to which the contest was limited and inquiries were received from many persons in other states. Mr. Cunningham expects that within a few years the number of entries will reach several thousand.

Photo courtesy Chicago Park District

A PREVIEW OF GEM SHOW

Mrs. Florence Kibbler Renaker, one of Chicago's amateur jewelry craftsmen, examines some of the precious stones and fabricated jewelry pieces submitted for the Chicago Lapidary Club's exhibit which will be open to the public at the Museum from June 1 to 30.

Photo courtesy Chicago Park District

TYPICAL AMATEUR GEM SHOP

Amid scenes like this were made the creations in precious gems and metals to be shown at the Museum in June. Orville McGill (left) is in the automobile business, Jack Best is an engineer, Juanita Parsons is a high-school teacher—but in their spare hours all are gem craftsmen.

TWO SCIENTIFIC SOCIETIES TO MEET AT MUSEUM

The American Society of Mammalogists and the American Society of Ichthyologists and Herpetologists will be guests of Chicago Natural History Museum during their annual conventions this year. The mammalogists will meet from June 27 to 30, inclusive, and the ichthyologists and herpetologists from June 28 to 30, inclusive. An estimated 250 to 300 members from the United States, Canada, and Mexico will attend the meetings.

The daily sessions consisting of the reading of scientific papers and discussions will be held in the Museum.

A BIRD-MAN'S ADVENTURES IN EL SALVADOR

By AUSTIN L. RAND*
CURATOR OF BIRDS

My son Stanley and I are at work in the tropical research station of El Salvador, known officially as Instituto Tropical de Investigaciones Cientificas de la Universidad Autonoma de El Salvador. The institute, a pleasant, cool, one-story building, is situated on the edge of the city, with the Volcano of San Salvador rising behind it. Two wings contain working quarters for biologists, chemists, and geologists. Administrative offices connect the two wings, and there is a library. In construction next to the institute is a three-story guest house that will supply modern living quarters for five guest-workers.

The director of the institute, genial Dr. Carlos Llerena, a man busy with his medical practice and with civic duties, finds time many mornings to visit the institute. The technical director is Dr. Adolf Meyer-Abich, who is interested in philosophy and the history of science.

THE MANANA MOOD

It's a pleasant, friendly atmosphere we live in here. There is nothing of the hustle and bustle that characterizes our northern life. If something doesn't get done today, there is always tomorrow. Gradually we have been brought to accept this pleasant idea of *mañana*. The first time it took two weeks to get a manuscript from the post office, we raged. But by the time it had taken a month to get our equipment from Pan American Airways and into use we had accepted the philosophy of the country. In the long run, say one hundred years more, no one will know the difference.

Though we spend more time commuting than I did in Chicago, we don't begrudge the time. We go past little sidewalk restaurants where women are patting out tortillas and cooking them on an iron plate over an open fire; past pack animals loaded with great tins of what must be milk; past two-wheeled oxcarts loaded with firewood; past vendors of little bits of this and that, from religious pictures to cigarettes and sweets. There are big shops, too, with all the amenities one could hope for; but it is touches like the children naked but for a tiny shirt and the women with huge baskets balanced on their heads that intrigue us.

Sometimes we go down the streets where farm people bring in their produce, and the snail's pace at which we travel allows us to inventory the contents of the baskets. Still more intriguing are the glimpses we catch of what goes on behind the doors of the houses. In most sections of the city the walls of the buildings rise from the sidewalks. Doorways and tall windows, often barred, have solid doors that close them; but when open there are half-length shutters that make at least a pretense of keeping out the vulgar gaze and let in air. Glimpses past them show a surprising variety of things. Behind one window may be a room with stacks of firewood for sale; behind another, a bedroom. Behind others may be a little general store, a charming living room, a tailor shop, a patio with palms and greenery, a kitchen with dining room or restaurant. And once, in a village, I looked in and saw a mule. From the outside the windows all look alike.

ADVENTURES AFIELD

Once at the institute our day starts officially. The institute is laid out so that work can be done there, with material brought in and kept there. But the value and the importance of a biological station should be in studying nature at first hand in the field. So we set out to see, study, and collect as much as we can. Only necessary writing and preparation keep us in the institute.

To work on foot from the institute has its adventures. Dodging the bulldozers and the construction crews we go through the little groves and the gullies where there are a few trees left. There's a rustle in a bush. We look, expecting a tinamou, and see a chicken or a cow or a pig. Up in a tree there may be a boy getting green mangoes or a woman gathering pito flowers to flavor the frijoles for the evening meal. Our collecting that involves shooting necessitates constant vigilance. We want especially to find and study orioles' nests. Orioles nest on the tips of branches, but the people here have a habit of climbing trees and lopping off branches for firewood. This removes the orioles' favorite nesting places, and makes the area less attractive to them.

Finally we come to farm country, where fields and hedges, tiny coffee plots, and banana clumps cover the country cut up by brush filled ravines, and the houses are farther apart. Birds are generally common, and we record things like the habits of the russet-tailed sparrows that recall our white-crowned sparrow, the big, long-crested, blue-and-white magpie-jays, and the white-throated saltator whose song recalls the towhee's "Drink your tea."

COWS LURE CUCKOOS

One project we have in hand is on the efficiency of cows as beaters for anis. Anis are black, grackle-sized cuckoos that, despite their short legs, walk about in the grass catching insects. But if there is a grazing cow in the vicinity the anis go to it, stand about its head, and catch the insects the cow scares up. Tentatively we think the ani catches twice as many insects in a given time by following a cow as it does by its own unaided efforts.

But on foot we can reach only a little of the country. We like to make longer trips afield by jeep. The institute has one jeep for the use of maintenance, and for field trips by the geologist (Dr. Sharat K. Roy) from the Museum, a botanist from Germany, a chemist from Germany, an entomologist from France, and ourselves. So we combine our field trips or take turns using the jeep. In the month and a half that we have been here we have made four trips by jeep. We have been twice to Lake Ilopango, where lake and streams vary the habitat and birds swarm. Once we went to Santa Tecla, where coffee plantations predominate, and once we made a long week-end trip to the cloud forest, where the high point of the trip for us was to see two quetzals. Trips into the field for more than a day or so need special personnel and preparation. Food and water, as in any tropical country must be looked after for health reasons, and the camp must have an attendant.

Over Holy Week (Easter), when all work stopped, the Salvadorean government geologist who works at the institute, Dr. Helmuth Meyer-Abich, kindly took us under his wing and showed us the country from end to end—from Anamaros and Santa Rosa to Metapan. Except for the coastal lowlands we saw most of the country accessible by car: the farmlands, coffee *fincas*, scattered trees and forest, old lava fields, and cornfields on steep hillsides. It's the dry season now, and most trees are leafless, except the mangos and the trees along the water courses, dry or otherwise. The grass is bleached pale red, or yellow, or whitish, and most water courses are dry. From the pine forests at La Palma and at San Jose, where the pines start at 800 meters altitude, we looked up through our binoculars at the little bits of cloud forest that lap over the mountain tips from Honduras and come down to 1,800 meters altitude.

MILES DON'T COUNT

Miles and kilometers lose their value as an indicator of distance in this country. The roads, once off the one main highway, are oxcart tracks. To the traveler hours and minutes are units of distance. It's more important to know that the trip to Ilopango takes 45 minutes than that the distance is 15 kilometers.

Everywhere we go we keep our eyes open for birds. Everything is grist for our mill. Our main object at this institute is to write the sections on the habits of the birds for a forthcoming book *Birds of El Salvador*, which is to be translated into Spanish and used by the people here. We have a good start on it now, for in the Museum Melvin Traylor, Jr., Research Associate, has already done the descriptions and the keys. These we use to identify the birds we see. Little by little, as our notebooks fill with data and our collecting chests with specimens, we see our way to our goal.

*Dr. Rand is a member of the current Salvadorean Project of Chicago Natural History Museum.

DAHLIAS—NEW FACTS ABOUT THESE GARDEN FAVORITES

By EARL E. SHERFF
RESEARCH ASSOCIATE IN SYSTEMATIC BOTANY

RECENTLY an entirely new kind of dahlia was found in southern Mexico, a kind that grows perched on the trunks of lofty forest trees, makes its way upward to a height of some 75 feet, and then clambers over the topmost branches, bedecking them with billowy masses of snow-white blooms (see illustration). With this find we have been made to realize that our knowledge of dahlias has been far from complete, in spite of the fact that for more than a century and a half few garden flowers have so thoroughly intrigued great sections of the flower-loving public in this country and Europe as have dahlias.

MacDOUGALL'S DAHLIA, THE ONLY KNOWN EPIPHYTIC SPECIES

Plants of this weird species are perched at varying heights midway up the trunks of tall trees in the cloud-forest in Mexico. They send their roots downward and their shoots upward. Reaching the tree-tops, at times 75 feet above ground, they sprawl over the branches, bedecking them with billowing masses of snowy white blooms, as shown in illustration above.

The early history of these flowers is wrapped in obscurity. It is known, however, that their native home was in Mexico and Central America. Long before they were conquered by the Spaniards, the inhabitants of these countries treasured dahlias in their private and public gardens. Fences were ofttimes built out of canes cut from stems of the taller sorts, and these canes, taking root, in due time put forth leaves and flowers without any urging. As may readily be understood, these early people knew nothing of a Swedish Professor Andreas Dahl or of the name *Dahlia* that was to be created later on, in Professor Dahl's honor, for the genus containing these interesting plants. And so they had their own dialectic names for the various kinds known to them, such as *acocotli* (or water-cane) and *cocoxochitl* (or caneflower).

Late in the eighteenth century Cervantes, director of the Mexican Botanical Garden, sent dahlia seeds to Spain. From these the great Spanish botanist Cavanilles raised numerous plants at Madrid, these plants becoming the basis of his new genus *Dahlia* and its first published species.

About the same time, so we read, the French botanist, Nicholas Thierry de Menonville, sent seeds to other parts of Europe. Presently introductions were made into England and Scotland. Horticultural exhibitions soon came to feature new forms. Indeed, the two species that were first planted in Europe and Great Britain were found to be genetically so unstable that "new forms" were obtained in almost endless profusion. Almost imperceptibly there arose a craze for new and larger (or sometimes smaller) and more beautiful (or sometimes merely more freakish) horticultural varieties. By 1934, authorities reported that a total of no fewer than 14,000 named varieties of dahlias had been introduced into the floral trade.

Today the number continues to grow, and at the dahlia shows held each autumn in our larger American cities thousands of visitors crowd about the exhibits to gaze at and admire some of the latest novelties. In Chicago, the largest and most important dahlia show is the one held every year at "dahlia time" in Garfield Park Conservatory. The throngs are often so vast at this famous show that visitors must fit themselves perforce into a sort of prison lockstep and march in single file past the exhibits at little more than a snail's pace.

With few exceptions, the great multitude of cultivated varieties of dahlias seems to have come from the two originally known species (*Dahlia pinnata* and *D. coccinea*) raised by Cavanilles in the Royal Garden at Madrid about 1790 and the cactus dahlias from a single freak plant that "flowered in Europe for the first time in 1864." With the passing of time, the confusion in the identification of the numerous varieties has become so great as to discourage most botanists from attempting to identify them or even to speculate as to their derivation. Sometimes a garden variety with queer foliage, as for example the "Bishop of Llandoff," is encountered in collections and from its leaf-pattern suggests an admixture of a pure native stock, in this case of *Dahlia scapigera*,

CLOSER VIEW OF MacDOUGALL'S DAHLIA

The defoliated wind-beaten stems of the previous season, with remnants of the former flowering-heads, are an interesting feature of tree-dahlia country. The photograph shows the well-known nurseryman and botanical explorer and collector, Thomas MacDougall, at a habitat in southern Oaxaca, Mexico. Plants are presumably Dahlia excelsa.

but usually our definite knowledge amounts to "four minus four."

A UNIQUE DAHLIA GARDEN

Recently the Royal Horticultural Society in England has set about trying to remedy this situation. It has established at Wisley (in Surrey) a unique dahlia garden, wherein seeds from every obtainable wild or feral kind of dahlia can be planted. In this way

A SINGLE LEAF, TWO FEET LONG

Specimen is from a tree-dahlia (Dahlia excelsa) standing at the side door of Santo Tomás Church in Chichicastenaogo, Guatemala, famous for the smoke-worship rites of the Quiché Indians.

it is hoped to roll back our dahlia knowledge to the time when our cultivated dahlias were in their pristine state. Once the few dozen native or spontaneous kinds of dahlia are established at such an experimental farm where they can be studied through the years by geneticists, it may be possible to interpret our modern "cultigens" more easily.

To many dahlia enthusiasts, a dahlia's importance increases with the size of its flowering-head. However, in our far Southwest, where cultivated specimens of the so-called tree-dahlias may be found, many residents pride themselves on the height or perchance the robust stature of their dahlia plants. Unlike other dahlias, which seldom grow more than three to six feet tall, tree-dahlias grow usually from eight to twenty feet tall. The lower foot or so of their stem tends to be woody and perhaps three inches thick. This portion sends up one or more tall, bamboo-like branches or subordinate stems, the stem-leaves mostly dying off below, which gives a nude or barren appearance to the plant. Numerous leaves are left toward the top, however, and the great inflorescence at the very top, often six feet across and with up to perhaps three hundred "single" dahlias, is a sight long to be remembered.

PRIZED FOR CENTURIES

An examination of the writings of Dr. Francisco Hernandez, who botanized in Mexico during the 16th century, and of other writers since then, and also of the reports brought back from various Mexican and Central American localities by collectors, leaves no doubt that tree-dahlias were known and prized for centuries before European botanists came to know them. Not until 1838, however, was the first tree-dahlia given a conventional scientific name. It was described and illustrated by the great English botanist, George Bentham, under the name *Dahlia excelsa*.

The circumstances attending its discovery make most interesting reading. A consignment of Mexican plants had been received in 1830. It had been protected on the outside with some thick branches or stems, the better to withstand the long, rough journey across the Atlantic. These were found to be showing signs of life. Out of curiosity they were planted in open ground and grew to a height of ten feet, but perished when winter came. (The writer is reminded of one of his own experiences. Two sturdy pieces of tree-dahlia stem were used by him as stiffening rods for rolled-up maps when he returned to this country from Guatemala in 1949. The pieces of stem were planted in huge pots of soil and within a few weeks had produced plants, one eight feet tall.)

In 1834, William Bates imported cuttings and roots of the same plant from Mexico, where he had collected it in the Valley of Mexico on October 7 of that year. Soon material was distributed to various horticultural centers. A plant in the greenhouse of the Liverpool Botanical Garden grew twenty feet tall. Soon afterward, Bentham published an illustration and description of

A SINGLE LEAF, ABOUT 34 INCHES LONG

This dry leaf is from another tree-dahlia (Dahlia Lehmannii), seed of which had been collected by Hawkes and plant raised at the Wisley grounds of the Royal Horticultural Society in England. The leaf was obtained for Dr. Sherff by the society's director, J. S. L. Gilmour, in late autumn, 1950.

CANE-LIKE STEMS OF TREE-DAHLIA

A single flowering-spray.

this new kind of dahlia, calling it *Dahlia excelsa*. He stated that the plants grew thirty feet tall in their native country.

So regal is *Dahlia excelsa* in general appearance, especially during the early winter months when loaded with its many lavender-rayed, "single-flowered," mostly upturned heads, that it is used in various parts of Mexico and neighboring Guatemala and even in California for ornament. In the rectory garden at the south side of the famous Santo Tomás Church in Chichicastenango, Guatemala, visited by many tourists each year to see the quaint Mayan religious ceremonials, the writer found two mammoth clumps in the autumn of 1949. From one of the stems some average-sized leaves were obtained through the kind permission of the presbitero in charge, Don Santiago Gil, one of which is shown in an accompanying illustration. It was two feet long. In a state of nature, the old leaves break away or get beaten away by the wind, and for months to come the denuded stems stand skeleton-like.

NATIVES DRINK SAP

Much more abundant, in Guatemala and southward to Colombia, is Lehmann's tree-dahlia, *Dahlia Lehmannii*, a plant with more compound leaves and mostly narrower leaf-segments. Like *Dahlia excelsa*, it has stems completely cross-partitioned at the joints. In this way the stem is divided into many vertical chambers, each several inches long, and these may be filled with watery sap (*cf. acocotli* or water cane). Many a thirsty native has quenched his thirst with this sap. Specimens growing at Antigua, in Guatemala, were found by the writer to have leaves up to three feet long. These were vigorous specimens growing at the experimental farm of the Iowa State College–Guatemala Tropical Research Center. They had been planted by the Director, Dr. I. E. Melhus, who had obtained specimens

directly from the great Volcán de Agua nearby, where the plants abounded in the roadside thickets. The leaf illustrated was very kindly supplied by J. S. L. Gilmour, Director of the Royal Horticultural Society's Gardens in England. It was about 34 inches long in the dry state.

Perhaps the most dazzling of the tree-dahlias for sheer beauty of flowering-heads is the handsome *Dahlia imperialis*, first described from Mexican material by Benedict Roezl. The writer raised noble specimens of this species for several years in the greenhouses of the University of Chicago (where the plants were faithfully cared for through the kindness of the head-gardener, M. J. Costello) and of the Chicago Teachers College. The great candelabra-like panicle at the top bore numerous "single" dahlias that were often seven inches across. The usually eight rays sometimes were white suffused with faint lilac and at the base streaked with blood-red or in some years (even on the same plant!) uniformly lilac throughout. While in the other tree-dahlias the heads point outward or upward, in *Dahlia imperialis* they nod or droop and are distinctly bell-shaped.

NEW SPECIES DISCOVERED

About 1936, Thomas MacDougall of New York was on one of his many trips of botanical exploration in southern Mexico when he chanced upon a strange white-flowered dahlia sprawling along over the tops of forest trees. He obtained seed from plants on Cerro Chivato, in what is probably territory of the village of San José Quianite (in the general area fifteen miles or so west-southwest of Tehuantepec, Oaxaca). In recent years he has revisited the same general area several times, accompanied by one or more of his native helpers. Paths were slashed into the dense jungle-growth of the cloud-forests where the peculiar dahlias were growing and, after the greatest of difficulty, flowering and fruiting specimens were obtained for scientific study. The plants were found to represent a species quite foreign to all our previous concepts of dahlia and to constitute indeed a new species.

Late last year this species was described for the botanical world under the name *Dahlia Macdougallii*. From the illustrations some idea may be obtained perhaps of the bizarre nature of this striking novelty. Mr. MacDougall revisited, on December 2, 1950, the very forest where for several years he had been making his more recent collections of it. This was a stretch of cloud-forest at a height of from 7,000 to 7,500 feet above the town of Santo Tomás Teipan (in the same area as Cerro Chivato above cited).

His letter of December 12 states: "I find that the plants are epiphytic, at least to begin with, and that the roots extend down the tree trunks and then ramify into the humus on the ground. Approximately half of the height of the plant is root. This time I estimated the total height of one plant to be 75 feet. Because of the weakness of the roots, we were unable to haul down a plant from the ground, but by climbing a tree we were able to dislodge a shorter specimen. The Dahlia grows on a number of tree species. The plant we pulled down was on an Oreopanax and a number were on an oak species. . . . The branches of the Dahlia are quite solid and the heavier ones are distinctly woody. The plant we took down —and photographed—had stems and roots up to 5 cm. in diameter, and the juncture of the roots and stems formed a heavier, almost bulbous structure."

IMPETUS TO RESEARCH

It may be observed here that with the discovery of this new dahlia, *outstandingly different because of its epiphytic habit of growth, its roots up to two inches thick and thirty-five or more feet long, its stems solid, woody, up to two inches thick and thirty-five or more feet long, and with branches sprawling for considerable distances over tall forest trees*, a new impetus may well have been given to the scientific study of dahlias. Possibly, as has been done in the past with the stems of tree-dahlias, the stems of MacDougall's dahlia may be grafted by the horticulturist into roots of low-growing kinds, so that manageable specimens can be raised for scientific and other purposes in ordinary greenhouses. For the present, however, there seems no doubt that this remarkable dahlia typifies an entirely new section (described by the writer elsewhere in a forthcoming article) in its genus.

Moreover, since the small terminal flowering sprays customarily preserved as herbarium specimens represent so inadequately the true character of a species like *Dahlia Macdougallii*, only field studies of the taller sorts in their native haunts, we may confidently assert, can be of much value hereafter for drawing descriptions. The new Pan-American automobile highway, now nearing completion, passes within a moderate distance of Santo Tomás Teipan, this dahlia's type locality. Elsewhere, too, the highway winds through dahlia country. It may well become a means whereby many of our younger and more enthusiastic botanists can penetrate deeply into the tropical forests of southern Mexico and of Guatemala and add immeasurably to our knowledge of these attractive plants. Meanwhile we hope that tree-dahlias and epiphytic dahlias may one day make their appearance at our local dahlia exhibitions.

Technical Publications Issued

The following technical publications were issued recently by Chicago Natural History Museum:

Anthropological Series, Vol. XXIV, No. 2. *The Medora Site, West Baton Rouge Parish, Louisiana.* By George I. Quimby. April 10, 1951. 58 pages.

Fieldiana: Zoology, Vol. 33, No. 1. *Philippine Zoological Expedition, 1946–1947, Narrative and Itinerary.* By Harry Hoogstraal. April 18, 1951. 86 pages.

Books

(All books reviewed in the BULLETIN *are available in The Book Shop of the Museum. Mail orders accompanied by remittance including an allowance for postage are promptly filled.)*

GEM HUNTERS' GUIDE. By Russell P. MacFall. Science and Mechanics Publishing Co., Chicago, 1951 (second edition). 187 pages, with illustrations. Price $3.

This book may well be used as an introduction for anyone, young or old, who is interested in the popular hobbies of mineral collecting or amateur lapidary work. By including in the book an extensive list of mineral localities in the United States and several chapters on how to go about collecting and identifying minerals, the author answers two of the most important questions confronting the amateur collector: "Where can I find it?" and "What is it?" From his thirty years of experience as an amateur collector the author has also included many helpful hints to guide the beginner in obtaining information that will make his hobby more informative and enjoyable.

HARRY E. CHANGNON
Curator of Exhibits, Geology

AMERICAN INDIAN BEADWORK. By W. Ben Hunt and J. F. "Buck" Burshears. The Bruce Publishing Co., Milwaukee, 1951. 63 pages, 19 text figures, 54 halftones, 13 color plates. Price $5.

This useful book is a guide to the fundamentals of beadworking and ideas for design. Methods and directions for doing different types of beadwork are clearly described and illustrated. Moreover, there is a good selection of pictures of regional and tribal Indian design for the beadworker to copy or use as a stimulus for his own designs.

Some of the methods described are sewed beadwork, loom work, and rosette making. There are also instructions for making bead looms, sorting beads, sewing with sinew, and for using skins or leather.

This book is admirably suited to meet the needs of boys' camps, scout leaders, and persons interested in handicraft.

GEORGE I. QUIMBY
Curator of Exhibits, Anthropology

LECTURE TOURS IN JUNE, DAILY EXCEPT SUNDAY

Tours of exhibits, under the guidance of staff lecturers, are conducted every afternoon at 2 o'clock, except Sundays and certain holidays. On Mondays, Tuesdays, Thursdays and Saturdays, general tours are given covering all departments. Special subjects are offered on Wednesdays and Fridays. A schedule of these follows:

Fri., June 1—Strange Sea Animals. Illustrated introduction in Meeting Room (*Lorain Farmer*).

Wed., June 6—Lands of Perpetual Summer: The Tropics (*Anne Stromquist*).

Fri., June 8—Toys: Playthings from Aleut to Zuni. Illustrated introduction in Meeting Room (*Harriet Smith*).

Wed., June 13—Strange Ancient Customs (*June Buchwald*).

Fri., June 15—The World's Gardens: Domesticated Plants. Illustrated introduction in Meeting Room (*Miriam Wood*).

Wed., June 20—What to Wear: Unusual Materials Used in Clothing (*Marie Svoboda*).

Fri., June 22—Other Worlds: The Solar System. Illustrated introduction in Meeting Room (*Anne Stromquist*).

Wed., June 27—Fragrant Plants: Perfumes, Spices, Incense (*Miriam Wood*).

Fri., June 29—Wisdom of the Wild: Special Habits of Animals. Illustrated introduction in Meeting Room (*Jane Sharpe*).

STAFF NOTES

Dr. B. E. Dahlgren, Curator Emeritus of Botany, has returned to the Museum after a four-month expedition to Cuba, where he collected palms and other plants. . . . **Dr. Theodor Just,** Chief Curator of Botany, will leave in June on a field trip to collect fossil plants in Arkansas, Oklahoma, Texas, other parts of the Southwest, and California. Toward the end of the month he will join **Karl P. Schmidt,** Chief Curator of Zoology, at the meetings of the Society for the Study of Evolution to be held in Berkeley, California. Before leaving on this trip, Dr. Just attended the annual meeting of the Division of Geology and Geography of the National Research Council in Washington, D.C. . . . **Dr. Sharat K. Roy,** Chief Curator of Geology, currently a member of the Museum's project in El Salvador, has been granted permission by the Salvadorean government to conduct research in areas recently ravaged by an earthquake . . . . **Dr. Rainer Zangeri,** Curator of Fossil Reptiles, will accompany Professor Bernhard Peyer, Director of the Zoological Museum, University of Zurich, Switzerland, on a trip to a number of famous vertebrate fossil localities in South Dakota, Wyoming, Utah, and Nevada. Dr. Zangerl will spend a few days at the paleontological laboratories of the University of California at Berkeley.

LAYMAN LECTURER TOPS PAST SUCCESSES

Returning to the Museum after an absence of two years to present his eleventh season of Sunday afternoon layman lectures, Paul G. Dallwig scored his greatest success as the Layman Lecturer during the 1950–51 season. During the five months in which he lectured, with a different subject each month, requests for reservations ranged from 1,500 to 2,200 a month. The type of lecture he presents, part of which involves inspecting exhibits in the Museum's public halls, made it necessary to limit attendance to between 150 and 200 persons. Thus, unfortunately, many who requested reservations could not be accommodated but were placed on the waiting lists, some of which will carry over into the new season beginning next autumn. Those attending the twenty-one regularly scheduled lectures of the season, plus two special ones that took care of some of the overflow requests, numbered 3,466.

As in his past seasons, Mr. Dallwig's Layman Lectures continued to be one of the most popular features ever offered by the Museum, and public response has been most gratifying. Both the Office of the Director and Mr. Dallwig himself have been flooded with letters of appreciation by those who attended these Sunday afternoon events. Many requests are already coming in for reservations for the 1951–52 season.

Mr. Dallwig's subjects during the season just concluded were: "Life—What Is It," "The Caveman Knew His Way Around," "Living Races and Their Way of Life," "Behind the Scenes in Our Museums," and "The Romantic Story of the Diamond."

New Members

The following persons became Museum Members between April 17 and May 15:

Associate Members

LeRoy B. Herbst, Leonard O. Krez

Annual Members

Mrs. Henry Warren Austin, O. H. Banker, A. M. Brown, Mrs. Stanley M. Burrell, Dr. Thadd F. Bush, Richard L. Droege, Conrad R. Emanuelson, Rogers Follansbee, J. T. Georgeson, Prof. John W. E. Glattfeld, J. S. Grasty, Jr., Joseph E. Henry, P. Sveinbjorn Johnson, Marvin B. Joyce, John Juley, Harry F. Keller, W. A. Mayfield, L. A. Miller, H. K. Nickell, Henry C. Nygren, Dr. Leo Oppenheimer, Mrs. Paul Rowan, Leon D. Sayers, Mrs. Charles W. Schonne, Robert T. Sherman, E. H. Teichen, George Von Gehr, Mrs. William Ernest Walker, Edward N. Wentworth.

FIFTY YEARS AGO AT THE MUSEUM

Compiled by MARGARET J. BAUER

From the *Annual Report of the Director* for the year 1901:

"Photography, Illustration, and Printing.—Each of these divisions reports unusual progress, both as regards equipment and work accomplished. The addition of more floor space to the printing office has made it possible to increase the staff, which was recently done. The employment of an artist in the division of illustration must be noted with satisfaction, being an acquisition which had been much needed."

U. OF C. PRESENTS FOSSILS

Chicago Natural History Museum has recently received the paleobotanical collections of the Walker Museum of the University of Chicago as a gift from that institution. These extensive collections have been assembled during a period of nearly fifty years by expeditions, purchase, and donations from many individuals. They include fossil plants from various geological ages and from many countries. Coal-measure plants, from the Pennsylvanian period, constitute the largest single part of the collections. These will supplement collections of this type already possessed by the Museum. Specimens from other Paleozoic periods, and from the Mesozoic and Cenozoic as well, provide records from ages not heretofore represented in the paleobotanical collections. This gift will permit expanded activity both in exhibition and research in the field of paleobotany.

EVERETT C. OLSON
Research Associate, Fossil Vertebrates

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the past month:

Department of Botany:

From: Herbarium, Department of Botany, University of California, Berkeley—140 algae, eastern China; William A. Daily, Indianapolis, Ind.—50 algae, Indiana; R. L. Dunkeson, Willow Springs, Mo.—26 phanerogams, Missouri.

Department of Zoology:

From: Mrs. C. A. Birdsall, Chicago—2 bird-of-paradise skins; Laura Brodie, Chicago—8 sunfishes and 30 top minnows, South Carolina; Harry Hoogstraal, Cairo, Egypt—257 frogs, 447 lizards, 22 snakes, 348 mammals, and 25 fishes, Yemen, Southwest Arabia; Royal Ontario Museum of Zoology, Toronto, Canada—2 bird skins, Canada; John G. Shedd Aquarium, Chicago —11 fishes, miscellaneous.

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Chicago Natural History Museum

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Members are requested to inform the Museum promptly of changes of address.

THE 'MONTH OF CHILDREN' BRINGS ITS THRONGS

BY JUNE BUCHWALD

RAYMOND FOUNDATION LECTURER

May is customarily the month of flowers—symbols of peace, quiet, and beauty. This, however, does not hold true in Chicago Natural History Museum where we celebrate May as the "month of children," and peace and quiet is shattered by thunderous footfalls, echoing calls, and unexplainable noises only children are capable of producing.

All past attendance records were broken this year. School boys and girls poured in both entrances of the Museum about 70,000 strong, representing most of Illinois, Indiana, Michigan, and Wisconsin. The revolving doors spun around as the energetic youngsters burst in, restrained only by the fearless guards who checked their progress until a teacher, harassed but grateful, finally emerged from the rear entanglement. Of the unscheduled organized school groups it is estimated that about 20 per cent asked for tours and about 20 per cent mistakenly thought they were scheduled for tours.

Speaking of tours, the Raymond Foundation staff of seven lecturers gave 247 lecture-tours to 8,000 children and had to turn down about 125 groups totaling 4,500 children. Of course, in addition to out-of-town school groups on field trips, the Chicago Public Schools (the largest number since 1941) came in for tours on specific subjects related to their school curriculum. Proving that man's prime interest is in himself is the fact that the most popular subject-matter was the hall of prehistoric people. Rainy May days brought zoo-lovers to our animal halls, placing animals second in the popularity poll. Third place goes to Egypt, where even the mechanical equipment for the x-raying of Harwa, 3,500-year-old Egyptian mummy, broke down under the strain.

MUSEUM 'ENTRUSTING'

Satisfaction in her efforts is gained by the guide-lecturer when she receives letters from the children after a tour. Here are some

A BUSY DAY AT MUSEUM

Special buses, bringing groups of school childreo from communities in several states, jam parking area.

choice bits from such letters of third-graders: "The Museum was very nice, because you expressed your words so well"; "Thank you for shooing us around the Museum"; "I had lots of fun, seeing the bones from the dinosaurs, and other Prehistoric animals. And the dummies [mummies] were so good prepared"; "The Museum was very entrusting. The exhibits were very entrusting. Last night I dreamed of giant dinosaurs—the bones of the dinosaur made me shiver as if I had been dunked with cold water."

Regardless of how many times a guide travels the same route, she finds interest in the variety of groups and in the questions asked of her: "Are the Eskimos stuffed?" "How do you preserve the mummies?" "Will those ostrich eggs hatch some day?" "How did those penguins get into that case?" "My mother doesn't believe about the storks. Do you?" Most popular question of all is, "When do we eat?"

To accommodate these seemingly starving children, the guides, lunchroom attendants, guards, and maintenance staff co-operated and labored to plan an efficient schedule each day using all facilities—cafeteria, lunchroom, picnic-room, and baskets to hold the unusually large lunch bags the children carry. In fact, after thorough research and calculation, it is estimated the average child carries in his brown No. 20 paper bag or in his mother's size-7 shoe box (his own would be too small) two sandwiches, an apple, orange, cookies, cake, and candy.

THIS MONTH'S COVER

Our cover picture represents an outpost in a typical tropical cloud forest on the border between El Salvador and Honduras. It is in just such localities that Dr. Austin L. Rand, the Museum's Curator of Birds, is currently conducting ornithological field work and of which he writes in his article on page 3: "The forest is filled with a semisolid, slithering something that is moving, flowing back and forth through it. It gives an eerie, lost-world feeling of a living presence everywhere about you. It's really dark . . . And even though not rainy, it's wet . . . everything is dripping."

One little girl proudly confided that the bag clutched in her right hand contained four sandwiches, three eggs, an apple, and three cupcakes, while the left hand enveloped a half-dollar coin for supplementary foodstuffs. The lunchroom display evidently proves so tempting that on occasion a child with no hesitation plops that lunch, over which his mother so lovingly labored, into a near-by wastebasket to choose the fare on exhibit. The thirsty little people consumed 16,000 bottles of soda pop, 9,300 half-pints of milk, and 9,200 ice cream cones. Total attendance for the weekdays was 28,000 with full house from 11:00 to 12:30 every day.

'BROWSING' NOT PASSIVE

After lunch came the browsing period intended for individual observation according to personal interests. However, browsing is a loose term, and in this case included

YOUNGSTERS INSPECT SARCOPHAGUS

One of the Raymond Foundation school groups in the Hall of Egypt.

everything from hide-and-seek to elevator-riding. John, the elevator operator, was in great demand. Too often when he answered the insistent buzzer, he would find a group

(Continued on page 3, column 1)

EL SALVADOR'S CLOUD FORESTS, QUETZALS, AND RAVENS

By AUSTIN L. RAND
CURATOR OF BIRDS

CLOUD FOREST occupies the highest peaks and ridge crests in El Salvador. And this cloud forest assumes a strange importance in the minds of biologists here. The extent of these forests is not great, probably only a score or so of square miles all told. Most of them are difficult to reach and they are not typical of the country. Perhaps these very things are their attraction. Compared with most other parts of the country—cornfields, pastures, coffee fincas, and brush—that have a long dusty dry-season, the cloud forest is truly tropical with its lushness and greenness throughout the year.

My son Stanley and I have visited three of the four important cloud forests here. It's an old story to me, of course. I've lived month after month in dripping mist-filled cloud forest that stretched for hundreds of miles in Madagascar and New Guinea. But to Stanley, fresh from temperate climates, these cloud forests fulfilled all his ideas of what a tropical forest, a teeming jungle, should be. The tall trees were heavy with epiphytes and lianas, there was undergrowth galore that made forcing a way through the forest very difficult, and here and there were shrubbery glades. When the clouds were not down and the sun shone, the undergrowth was in twilight, even at midday, and the glades sparkled by contrast. As Stanley said, now he knew what Kipling meant when he had the Ethiopian and the leopard look into the forest and say that all they could see was spots and streaks. The patches of light and dark make no patterns at all to an uninitiated eye.

AN EERIE PRESENCE

How different it is when the clouds are down! And the clouds are usually down, for clouds and not rain give the perennial moisture that makes cloud forests possible. Then the clouds swirl through the glades, through the trees, and finally into the undergrowth. And they seem more than clouds. The forest is filled with a semisolid, slithering something that is moving, flowing back and forth through it. It gives an eerie, lost-world feeling of a living presence everywhere about you. It's really dark in the forest then. And even though not rainy, it's wet. The moisture condenses on the leaves, the moss is saturated, and everything is dripping.

It was *Mira-mundo*, "the lookout over the world," where we first visited the cloud forest. It took us three hours by jeep and a six-hour climb by mule beyond a hard road to reach these few square miles of cloud forest. The jeep was faster than the mules, but the mules were more comfortable. We spent the first night in the bunkhouse of a cattle station, in an atmosphere that recalled a ski hut in the Alps: the chill (for it's chilly at 5,000 feet in the mountains in the tropics, and the damp drives the chill in), the lantern light, the bare interior of the building, the wind whistling outside, a magnificent moonrise over banks of mist and clouds, and valleys far below.

Next morning we started on the wary little mules. Again I admired the sure-footed strength of the little beast that carried my 250 pounds up these steep trails. Hard by the cattle station was an enormous eucalyptus tree, at least five feet in diameter. Of course we'd been told that El Salvador was an old country, that the Hacienda San José where we got the mules was more than 200 years old. And the old coffee plantations and cleared fields told the same story. But this old giant of a blue-gum tree, an import from Australia in one of the most inaccessible parts of El Salvador, drove the fact home to me in a way that nothing else had done.

HUMID UPPER TROPICAL ZONE VEGETATION ON LOS ESESMILES

We climbed over grass and shrub slopes. Ahead we saw the tapestry of the forest canopy. The colors were green-olive, brown-olive, gray-olive, and rust-color, with many a dark blotch where a gap in the canopy let us look into the shrubbery beneath. Almost completely lacking were the vivid greens and yellow-greens that even in the dry country we'd left below were common along the waterless water courses.

LIKE A TUNNEL

At an entrance like a tunnel the trail went into the forest. Across the top of the entrance a lilac-flowered shrub had flung a branch. Then we were in a world of shadows and dull green, the inside of the cloud forest. A friendly proprietary, the Freund Company of San Salvador, had placed a house in a clearing in the forest at our disposal. This was very near the point where the boundaries of El Salvador, Guatemala, and Honduras meet. The caretaker, who was there with his wife, child,

'MONTH OF CHILDREN'—

(*Continued from page 2*)

of children on the second floor who had just run up the stairs for the pure joy of riding down again, making this vicious circle over and over. Patient John philosophizes, "Anything moving is the greatest attraction for children."

Finally, the teacher called a halt to the visit, and all prepared for an exit, which, of course, was past the book and souvenir shop. Here the teacher was forced to give "only five minutes now" to choose some little memento. So the two Book Shop attendants stood their ground as the horde of 35 to 40 youngsters attacked. Speed, dexterity, patience, and fortitude were required by the two young women, but they report that the situation was relieved somewhat by the fact that most of the children were attracted by the same item—the mystifying magnetic mummy, King Tut, selling for 50 cents. This fascinating fellow plus the souvenir rings, the chenille fuzzy pins, and the glass figures helped to double the sales in the month of May.

In closing may we make this suggestion to teachers: Why be like everyone else? The average teacher usually plans her class visit to the Museum in spring. To avoid crowded halls and crowded schedules, bring your students in January or February!

mule, cow, and dog, looked after us for our few days' stay.

It was the dry season, and so part of each day was fine. But mornings and evenings the clouds extended over from the Atlantic slopes to drench the forest and then were dissipated in the hot dry air that covers most of El Salvador. Ravens, of the same species that range over the northern parts of the Old and New World, came croaking about the clearing, especially when the mists were dense. Now, as well as associating these birds with the Tower of London (where they used to, and perhaps still do, keep a pair), with Poe's "Nevermore," and with spruce forests, I'll always associate them with mist in a tropical cloud forest.

THE QUETZALS APPEAR

The quetzal is of course the most famous of the cloud-forest birds. Nearly as large as a crow, with plumes almost a yard long, back and plumes glittering green and vivid pink below, the male is a magnificent bird. It is recorded as a shy bird, shunning man and his clearings. I hardly dared hope to see one. But before breakfast I was out walking the trail in the half light of dawn. The forest was drenched, but the mists were rolling back, and the rising sun was just touching the tops of the tallest trees. Ahead of me I heard a half whistle, half hoot, and in a moment two quetzals came flying to perch in a tree directly overhead. One, the male, had long flowing plumes. The other was presumably its mate. Though they were in plain sight, I could see little color in the shadowy morning light. Then, as if for my benefit, the male made a circular dancing flight up into the sunlight. Its iridescent green back gleamed, its vivid red flanks and belly glowed, and its undulating plumes—nearly three feet long—added grace to its movements. This view of the quetzals was one of the grandest pieces of good luck I've ever had. To have even glimpsed them would have satisfied me. Here I had one practically perform for me.

But birds generally were hard to find in the forests, as I've found usual in such mountain forests. There were only a few exceptions. Along the trails were two species of tiny hummingbirds that continually startled me by buzzing in my ears, and when I turned to look they would be somewhere else. One was slaty below, with white head markings, and always seemed to be chasing another one. The other was glittering green above, with a metallic violet gorget that had elongated corners. They seemed to "own" certain glades, perched there, squeaked, and supped at inconspicuous flowers in the shrubbery. A little tan-breasted flycatcher was another species that defied what seemed to be the almost universal rule of cloud-forest birds. It neither skulked in the shrubbery nor dashed away after a glimpse of me. If not the most common, it certainly was the most conspicuous bird. It sat up on dead twigs on the outer edges of the treetops, and from there made rapid rallies, in typical flycatcher fashion, for insects.

VISITORS FROM THE NORTH

This is my first trip to the American tropics, and I was thrilled to see two species representing American families I'd never seen before. One was one of the woodhewers, birds that, like gigantic brown creepers, spiral up tree trunks. The other was one of the toucans, a jay-sized green bird with an immense bill that gives it a head-heavy appearance, like a hornbill, that came into the quetzals' tree just after they left it. Then there were old friends spending the winter here while their summer home was in the grip of an Arctic winter: a yellow-bellied sapsucker from the northern spruce-aspen forests that looked out of place, going from bare place to bare place on the tree trunks, avoiding the epiphytes; and a yellow, black-capped Wilson's warbler that gleamed through the shrubbery, apparently as much at home as in the dwarf bushes of the Mackenzie Mountains.

This *Mira-mundo* forest and a few square miles of forest on another hill to the east along the Honduras border called Los Esesmiles are the only places where the Central American backbone of mountains with its cloud forests spills over into extreme northern Salvador. Originally there was probably much cloud forest on the central range of volcanoes (Santa Ana, San Salvador, San Miguel, and San Vincent) and perhaps on the coastal Balsam range, but most of it has gone into coffee or bush, and now what's left is a few square miles on Santa Ana, its subsidiary cones, and perhaps a square mile on San Salvador.

We visited the Santa Ana area on one of the smaller peaks locally known as Frog Mountain. We went all the way by jeep, up through the coffee and red dust, the grass, and shrubbery, into the old crater. Inside the crater is what is called Frog Lake. Perhaps in the wet season it may be a lake swarming with frogs, but it was a grassy meadow grazed by cows when we saw it. Around it, on the inside of the rim, was light, rather dry cloud forest.

A one-day trip to a cloud forest is the act of an optimist. We snatched things here and there. Every different place you visit seems to have a few things different, no matter how similar the places appear, and this forest, though poor and scrawny, was no exception. We found cloud-forest species new to us. Robins, like our bird in size and shape but dusky and with a chestnut collar, sang loudly in the trees. A little cloud-forest warbler with a brown breast mark gleamed through the branches and twigs. And strangely, white-winged doves, the same species as we have in the southern United States, cooed from the forest edge where they were apparently nesting.

When we visited the Volcano of San Salvador we had to leave the jeep at San José on the shoulder of the mountain and get a local guide to show us where the trail started for the two-hour climb on foot. It always amazes me how mountain people disregard the slope of mountains. They travel in spurts at a fast walk, or even a run, with rests here and there. And they keep up their rapid pace for distances that have a lowlander gasping in amazement as well as from lack of breath. They climb with as little apparent effort as a plainsman walks on the level. Our guide was like this. But there's a corollary to the endurance of mountain people, as we found in New Guinea. Mountain people when they get on the level have no more endurance than plains people in the hills.

The forest patch on the summit of San Salvador, the volcano that overlooks the capital and gives it its name, is fine and tall, but it is much dryer and has fewer epiphytes than the other forests. Here jays, of a species blue with a black head, gathered in bands, calling in the tree tops. They were the only conspicuous forest birds on our trip. Even more interesting to us was the country just below the forest and above the coffee. Here were planted flower gardens—not the vivid blooms of the tropics but familiar northern things: fields of roses, geraniums, daisies, pinks, carnations, and the like. At this high altitude they thrive and are gathered to be sold in the cities.

Here we found several birds new to us. The most important perhaps was a dingy little flycatcher that only an expert's eye would recognize as the second record for El Salvador. The most spectacular, however, was a mocking-bird with deep blue upper parts, white under parts, and a lovely rich song.

SUMMER LECTURE TOURS GIVEN TWICE A DAY

During July and August, conducted tours of the exhibits, under the guidance of staff lecturers, will be given on a special schedule:

Mondays: 11 A.M.—The World of Animals (general survey of the animal exhibits); 2 P.M.—General Tour

Tuesdays: 11 A.M.—Places and People (general survey of the anthropology exhibits); 2 P.M.—General Tour

Wednesdays: 11 A.M.—Green Magic (general survey of the plant exhibits); 2 P.M.—General Tour

Thursdays: 11 A.M. and 2 P.M.—General Tours

Fridays: 11 A.M.—Secrets in Stones (general survey of the geology exhibits); 2 P.M.—General Tour

There are no tours on Saturdays and Sundays, or on Wednesday, July 4.

MORE ABOUT EL SALVADOR—A BOTANIST'S VIEWPOINT

By NORMAN C. FASSETT*

Some sixty miles east of San Salvador, in the Central American republic of El Salvador, the traveler may look southward across a narrow valley to Jucuapa ("Hoo-coo-áh-pah") and Chinameca ("Cheen-ah-máy-ca"), built on the flanks of a series of volcanos that parallels the highway for twenty-five miles. From the highway, the aggregations of red-tile roofs do not appear like cities of ten thousand or more inhabitants, but people are crowded closely together in El Salvador.

The peak of a cone-shaped volcano seems scarcely the place to look for a lake, but that is exactly where Lake Alegría is located. The road up the mountain south of Jucuapa is incredibly dusty in the dry season, incredibly muddy in the rainy season, and incredibly steep in all seasons. It climbs from the land of bananas and coconuts to the land of coffee. Coffee is grown in the shade of trees, and the mountain side that from the highway appeared to be a vast forest proves to be a vast coffee grove. Then the coffee groves give way to native forest. Near the very summit of the mountain, at an altitude of something more than a mile above sea level, the road, which has been circling the mountain, turns sharply to the right, climbs abruptly over a ridge, and descends steeply to Lagunita Alegría.

THE TRAGIC 'LITTLE LAKE OF REJOICING'

Lake Alegría, deep in the crater of the volcano Tecapa in El Salvador, is surrounded by high steep walls. This photograph was taken several weeks before the recent catastrophic earthquake precipitated great masses of earth and rocks from the cliffs into the waters of the lake.

Alegría means "merriment" or "rejoicing." This little lake of merriment is actually in the crater of Volcán Tecapa. It is nearly round, about 300 yards in diameter, and surrounded by the abrupt walls of the old crater. Although forest grows on the cliffs and a lake occupies the crater, the volcano is not quite dead. Hot lava is not far beneath the surface, and on the shores are springs of hot water, bubbling and steaming and giving off an evil sulphurous smell. Two species of plants have adapted themselves to life in the water charged with poisonous volcanic products. One is an alga, which makes a green coating on the rocks and is probably responsible for the pea-soup color of the whole lake. The other is a small sedge, of the genus *Eleocharis*, which grows in shallow water close to the hot springs. This is of particular interest in view of the occurrence of a similar sedge in the hot springs of Yellowstone National Park, appropriately named *Eleocharis thermalis*. The sedge of Lagunita Alegría has been identified by Dr. H. K. Svenson, of the American Museum of Natural History, as *Eleocharis Sellowiana*, which ranges from El Salvador into South America and is closely related to *E. thermalis*.

Alegría is now a region of tragedy and sadness. Early in May, the mountains trembled, and thousands of persons who made their homes on their slopes became homeless. Chinameca was destroyed, and Jucuapa was such a shambles that the debris, with countless buried dead, was burned. At least six smaller towns, centering on the Merry Little Lake, are listed as almost uninhabitable.

A recent letter from Dr. Helmut Meyer-Abich, geologist at the Instituto Tropical de Investigaciones Cientificas, tells of some effects of the earthquake.* When the mountain shook, great landslides cascaded into Lake Alegría. Scores of enormous boulders rolled down the cliffs into the lake.

The lake and its scanty flora have probably survived such disturbances in the past. But severe changes are always possible in this region. There was a lake in the crater of Volcán San Salvador, which boiled away, literally, following the earthquake of 1917. There is Laguna las Ranas, occupying a crater in western San Salvador. In recent years it has become dry, and the cracked surface of what was once its bed is covered now with a dense turf of *Eleocharis Sellowiana*.

*Professor of Botany, University of Wisconsin. Sponsored by the Wisconsin Alumni Research Foundation and Chicago Natural History Museum, the author collected aquatic plants from September, 1950, to March, 1951, as guest of the Instituto Tropical de Investigaciones Cientificas in El Salvador.

*A report on the earthquake by Dr. Sharat K. Roy, the Museum's own geologist now in El Salvador, will appear in an early issue of the BULLETIN.

Paleontologists Sift 15 Tons of Sand

An idea of the strain imposed by scientific research upon the patience and endurance of its practitioners may be obtained from the experiences of Bryan Patterson, Curator of Fossil Mammals, and Orville L. Gilpin, Chief Preparator of Fossils, who washed and sifted more than fifteen tons of sand in search of tiny, almost microscopic specimens of fossil vertebrates on their recent expedition to northern Texas. The operation was somewhat similar to the placer method of gold mining. The geologists returned to the Museum last month, bringing as a result of their herculean task some 1,600 pounds of concentrate. Still further sifting of this will be required to complete the work of culling the fossil specimens.

Operations were conducted in the same general area as in the two preceding years. The first discovery in the Texas area of early Cretaceous mammal-bearing deposits was made by Museum men in 1949.

The gem collection of the Museum is one of the best in the world. Cut and uncut specimens of nearly every known precious and semiprecious stone are displayed in H. N. Higinbotham Hall (Hall 31), many of them of great historic interest.

A CLOSE LOOK AT 'KON-TIKI'

By ALEXANDER SPOEHR
CURATOR OF OCEANIC ETHNOLOGY

THE BEST-SELLER, *Kon-Tiki*,* has deservedly caught the imagination of the American public. This story of a voyage from the coast of Peru to the Tuamotu Islands of Polynesia, made in a balsa raft built to Inca specifications, ranks with the best tales of adventure. The first purpose of the undertaking was to demonstrate that the ancient Peruvians were capable of making voyages over such a tremendous distance in their own type of sea-going vessel. The *Kon-Tiki* expedition is sound proof that it could have been done and is a convincing answer to the skeptics who denied the feasibility of such voyages.

The second purpose of the trip was to lend support to the belief of Thor Heyerdahl, the leader of the expedition and author of the book, that the peoples and cultures of Polynesia are derived from the New World. This theory is outlined briefly in the book and through the introduction of bits of evidence is given implicit validation by Heyerdahl. However, it is one thing to demonstrate the possibility of making the voyage in a Peruvian-type raft. It is quite a different thing to demonstrate that the Polynesians actually came to their island home by raft and canoe from the shores of the Americas. As a museum curator and a professional anthropologist, both of whom are suggested in *Kon-Tiki* as being rather misguided and hopeless conservatives, I should like to point out a few reasons why Heyerdahl's ingenuous reconstruction of Polynesian prehistory is more novel than probable.

VIRACOCHA LEGEND

Heyerdahl uses as evidence the Peruvian legend of Viracocha, said to have been an ancient, blond, light-skinned hero-god who was supposed to have come to Peru with some followers of similar type in pre-Inca times, stayed for a time, and vanished. Heyerdahl believes that Viracocha and his colleagues actually existed, that they were responsible for the development of a culture in Peru called Tihuanaco (though it is not explicitly named in the book), and that about A.D. 500 they took to their balsa rafts and sailed to Polynesia, which they proceeded to populate with their offspring. Later, about A.D. 1100, Polynesia was supposed to have been invaded by Indians from the Northwest Coast of North America, who merged with the previous wave of migrants to form the historic Polynesian race and who evolved the historic Polynesian culture.

A few criticisms seem to be in order:

(1) Heyerdahl equates the Polynesian god Tiki with Viracocha because there is some evidence that the pre-Incaic name for Viracocha was "Con-Tici" or "Illa Tici," and at a later date sometimes "Con Tici Viracocha." That the Polynesian "Tiki" and the Peruvian "Tici" are the same is doubtful. Occasional chance occurrences of the same word or word element in two unrelated languages is a common phenomenon, while the etymology of the Peruvian "Tici" is far from certain.

(2) Hyerdahl considers the art style of stone carvings on Easter, Pitcairn, and the Marquesas Islands in Polynesia so similar to pre-Inca (presumably Tihuanaco) carvings in Peru that they must be products of the same people. These carvings may seem similar to Heyerdahl; they have never impressed critical students of the area as being alike.

(3) He gives credence to the observations of the early Dutch explorer Roggeveen that among the people of Easter Island were light-skinned individuals, presumably descendants of Kon-Tici, while he suggests that the red stone caps placed atop the massive Easter Island carvings represent the red hair of the early Peruvian migrants. The Roggeveen expedition account is known to have been much exaggerated. Polynesians are quite light-skinned on body parts not exposed to the sun and undoubtedly have a Caucasoid-like strain in their racial ancestry. But that this strain can be assigned to the legendary Con Tici Viracocha and his followers, or that early historic Polynesians included large numbers of white-skinned individuals, is quite unproven.

(4) Heyerdahl stresses the fact that the Polynesians were a "pure stone-age people" and states that "there were no cultures in the world of any reproductive capacity" at the probable time of the Polynesian migrations except in the New World. What is meant by "reproductive capacity" is not clear. However, the Peruvians at this time were using copper for building ties and other objects and technically were not a stone-age people. On the other hand, peoples who were skillful stone workers were living at the same time in both Malaysia and Micronesia to the west of the Polynesians.

(5) The sweet potato and the gourd are two New World plants that most students accept, with Heyerdahl, as being in Polynesia at the time of European discovery. Whether they were brought by Peruvians or whether Polynesians voyaged to the New World and returned with them is not certain. However, Heyerdahl actually made the trip in a Peruvian raft, while there are no recorded voyages of Polynesian canoes making a round-trip voyage to South America and back, although long voyages were likewise possible in canoes. Yet this is slim evidence for a migration theory and, as it has been pointed out, is like saying that, because the "Irish" potato is derived from South America, Irishmen are *ipso facto* migrants from South America also.

(6) For a possible migration from the Northwest Coast of America to Polynesia, Heyerdahl mentions similarity in art styles between the two regions. It was long ago suggested that the art of the Maori of New Zealand and that of the Northwest Coast were similar. A closer and more critical inspection of Polynesian and Northwest Coast art made by later students has not indicated similarities that are convincing. Also that the Northwest Coast Indians had sea-going canoes in A.D. 1100 is not known; nor are they ever known to have made long, open-sea canoe voyages in early historic times.

CONTRARY EVIDENCE

The principal argument against Heyerdahl's theory is found, however, in the large body of contrary evidence that ties Polynesia to Micronesia and in turn to Southeastern Asia—a body of evidence that he has deliberately ignored and even implied does not exist. The Polynesian languages belong to the Malayo-Polynesian family, which stretches in a great bridge from Polynesia across Micronesia and Malaysia to the Southeastern Asian island archipelagoes. The outrigger canoe is found across this same belt and, contrary to much popular belief, is perfectly capable of sailing close to the wind and making long easterly voyages in the trade-wind latitudes, although the double-canoe was the favored Polynesian open-sea craft. A series of Oceanic food plants, such as taro, the coconut (for which there is no good evidence that it was in the New World at the time of discovery), bananas, and breadfruit as well as the domesticated pig, link Polynesia to the Old World rather than to the New. These are only a few of many cultural traits that militate against Heyerdahl's theory.

There is also negative evidence to be considered. If Polynesians are in large part sea-faring Peruvians, why are not fundamental traits such as the highly developed Peruvian textile arts and ceramics found in Polynesia, for the raw materials exist there? Also, if Viracocha and his cohorts were blond or red-headed and light-skinned, they were presumably Caucasoids, and why has not a well-defined Caucasoid element been found in pre-Inca skeletal material? Prehistory of the Andes and Polynesia is not such a misty unknown as the book implies.

These criticisms are not directed against the idea that actual voyages were occasionally made by Peruvians to Polynesia. This seems highly probable. Criticism is directed against the idea that the Polynesians migrated en masse from the New World and that Polynesian culture owes its primary patterning to New World sources. This latter belief adds spice to the grand story of Heyerdahl's *Kon-Tiki* voyage. The belief remains nevertheless an enthusiasm of the author rather than the most probable explanation for Polynesian origins, based on a critical appraisal of the evidence.

**Kon-Tiki*, by Thor Heyerdahl (Chicago: Rand McNally, 1950)*

STAFF NOTES

Col. Clifford C. Gregg, Director, and **Karl P. Schmidt,** Chief Curator of Zoology, attended the annual meeting of the American Association of Museums held in Philadelphia May 31–June 2. Col. Gregg is a member of the council of the association. Chief Curator Schmidt presented a paper on "The Function of University Museums." . . . Chief Curator Schmidt has been elected a Fellow of the American Academy of Arts and Sciences. He recently gave an address on "The Origins of Domestic Animals" before the Midwest Humane Conference. . . . An expedition to collect upper Cretaceous and Eocene fossil plants in Alabama, Mississippi, and Tennessee was begun last month by **George Langford,** Curator of Fossil Plants, and **Dr. R. H. Whitfield,** Associate in Fossil Plants . . . . **Dr. Paul S. Martin,** Chief Curator of Anthropology, **Dr. Alexander Spoehr,** Curator of Oceanic Ethnology, **George I. Quimby,** Curator of Exhibits, **Dr. John B. Rinaldo,** Assistant Curator of Archaeology, and **Miss Elaine Bluhm,** Assistant in Archaeology, attended the annual meetings of the Society for American Archaeology held in Evanston recently. Dr. Martin was chairman of a session at which Dr. Spoehr presented a paper on the archaeology of Saipan, and Dr. Rinaldo was appointed a member of the Executive Committee . . . . Dr. Martin lectured and showed his motion picture, "Indians Before Columbus," at a meeting of the Anthropology Club at the University of Illinois in Urbana . . . . Dr. Spoehr attended a meeting in Washington of the advisory group for the Pacific Science Board's coral atoll program to complete final plans for the Board's atoll research project for the current summer in the Gilbert Islands . . . . **Donald Collier,** Curator of South American Ethnology and Archaeology, attended the annual meetings of the Division of Anthropology and Psychology of the National Research Council in Washington . . . . **Colin C. Sanborn,** Curator of Mammals, recently engaged in studies of Philippine mammals at the U. S. National Museum in Washington, D.C., and the American Museum of Natural History in New York. He particularly studied type specimens of rodents for completion of a research project . . . . **Dr. Theodor Just,** Chief Curator of Botany, has left on a field trip to the southwestern United States and California. He will also attend the Sixth Annual Meeting of the Society for the Study of Evolution in Berkley, California, where he will be joined by Chief Curator of Zoology Schmidt . . . . **Miss Lorain Farmer,** Museum guide-lecturer, recently appeared on Martha Crane's radio program on WLS and told about the work of the Raymond Foundation . . . . **Dr. Julian A Steyermark,** Curator of the Herbarium, has recently been engaged in botanical field studies in the Ozark region of Missouri.

SOUTH AMERICAN AND ORIENTAL FISHES ACQUIRED

The Museum has recently purchased the collection of fishes of the Carnegie Museum in Pittsburgh, an outstanding collection famous for its South American and Oriental fishes. No extensive work on the freshwater fishes of South America or on the marine fishes of the Far East is possible without consulting this basic collection.

In the early part of the century Carl H. Eigenmann, pre-eminent authority of his day on the freshwater fishes of South America, and his students amassed and described most of the South American material in the collection. Of the 575 species included, nearly half are represented by types. This part of the collection is of especial value also because it contains specimens from nearly all sections of South America.

The Oriental fishes comprise about one-third of the Carnegie collection and are both marine and freshwater species. In this portion there are approximately 1,753 species, of which 143 are represented by types. They are from many places in the Orient but principally from Japan, Formosa, and Korea. The Oriental collections were made and studied by David Starr Jordan and his associates and by various Japanese ichthyologists. In addition to these Oriental collections there are 1,364 lots of fishes from moderately deep (100 to 300 fathoms) waters off eastern Japan. These fishes were collected by Allan Owston, a shipmaster, who spent fifty years cruising and collecting in Japanese waters. Owston was a careful observer with some knowledge of fishes, and many little-known species are included in his collection.

Nearly all of the material in the Carnegie collection was studied, sorted, and selected before it was sent to the Museum, and because of this there is very little duplication. The geographic areas represented are those in which our Division of Fishes has not carried on extensive field work, and therefore the great majority of species are especially worthwhile additions to our study collections. Our number of types will be more than doubled. Incorporation of the Carnegie material will make it possible to utilize the South American material that we already have and will greatly aid in working on our marine fishes.

FISHES 'LANDED' FOR CHICAGO

Packing the collection of exotic fishes of the Carnegie Museum for transfer to Chicago Natural History Museum.

LOREN P. WOODS
Curator of Fishes

Annual Report Published

The Annual Report of Colonel Clifford C. Gregg, Director of the Museum, to the Museum's Board of Trustees, has just been published by the Museum Press. Distribution of copies to all Members of the Museum will be made at an early date. The Report, a book of 142 pages, gives details of all principal activities of the institution for 1950 and contains 24 illustrations.

Mexican Salamander Studies

Clifford H. Pope, Curator of Amphibians and Reptiles, plans to leave for the Mexican highlands about July 1, where he will study the habitat relationships of woodland salamanders. The salamander fauna of Mexico is of special interest because of its isolation and its similarity to that of our own southern highlands. Many of the Mexican species have been but recently discovered and are therefore little known. Investigation of the woodland salamanders of the southern Appalachians already has been carried on for several years, and so the time is favorable for an investigation in Mexico.

SPECIAL GEM EXHIBIT MOVING TO LOOP

The First Annual Amateur Handcrafted Gem and Jewelry Competitive Exhibition, held during June in Stanley Field Hall of the Museum under the auspices of the Chicago Lapidary Club, proved to be one

PRIZE-WINNING JEWELRY

Mrs. Helen Cooke (centee) displays a malachite bracelet that won "best in show" gold cup in the First Annual Amateur Handcrafted Gem and Jewelry Competitive Exhibition of the Chicago Lapidary Club held at the Museum dueing June. Othee prize-winning creations are worn by Gloria Johnston (left) and Carolyn McNeeney, Patricia Stevens models.

of the most successful and interesting special exhibits the Museum has had, and it attracted unusual public attention. For those who missed this display, it is announced that a second showing will be held in the State Street store of C. D. Peacock and Company from July 9 to 21, inclusive.

To those interested in and qualified for actual participation in the hobbies of collecting gem materials and fashioning them into finished gems and jewel creations, the Chicago Lapidary Club—whose members call themselves "rockhounds"—extends a cordial invitation to inquire about membership. Inquiries should be addressed to: Chicago Lapidary Club, Grand Crossing Park Fieldhouse, 76th Street and South Ingleside Avenue, Chicago 19.

PROGRAMS FOR CHILDREN ON THURSDAY MORNINGS

The Raymond Foundation will present its annual summer series of free entertainments for children on Thursday mornings for six weeks, beginning July 5. There will be five motion-picture programs and, on July 26, one puppet show. Two performances of each program will be given, at 10 A.M. and 11 A.M., in the James Simpson Theatre of the Museum. The theatre and west entrance of the Museum will be open at 9:30 A.M.

Children are invited to come alone, accompanied by parents or other adults, or in groups from clubs and various centers. Admission is free. Following are the dates and titles of the shows:

July 5—NANOOK OF THE NORTH
Robert Flaherty's film tells of a typical Eskimo family and their struggle for life in the far North

July 12—THE ANT AND THE GRASSHOPPER
The well-known story of the ant and the grasshopper is told in color movies, the actors being puppets
Also a cartoon

July 19—INDIAN STORIES OF TODAY
How Indians are living today and where
Also a cartoon

July 26—DICK WHITTINGTON AND HIS CAT (presented by Cole Marionettes)
This is a real marionette show, not a movie

August 2—BEAVER VALLEY (a Walt Disney film)
The finest of nature photographers helped to produce this story of the animals and life in a typical beaver pond
Also a cartoon

August 9—SEAL ISLAND (a Walt Disney film)
This color movie tells about the fur seals of the Pribilof Islands
Also a cartoon

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the past month:

Department of Botany:

From: University of California, Berkeley—180 algae, New Zealand and Fiji Islands; William L. Culberson, Cincinnati—30 algae and lichens, Ohio and Kentucky; R. L. Dunkeson, Willow Springs, Mo.—26 phanerograms, Missouri; Dr. William R. Taylor, University of Michigan, Ann Arbor—52 algae, Bermuda; Dr. Eula Whitehouse, Southern Methodist University, Dallas—27 algae, Texas.

Department of Zoology:

From: Margaret G. Bradbury, Chicago—6 bats, Missouri; Laura Brodie, Chicago—27 salamanders, 120 frogs, 9 lizards, and a snake, South Carolina; Chicago Zoological Society, Brookfield, Ill.—an egg of Humboldt penguin; Dr. James Kezer, Chicago—57 salamanders, North Carolina; John M. Schmidt, Plainfield, Ill.—a mammal specimen (*Mustela vison*), Illinois; Joseph H. Shirk, Peru, Ind.—3 mammal skulls (*Felis concolor* subsp.).

Division of Motion Pictures:

From: John W. Moyer, Chicago—2 16mm color films.

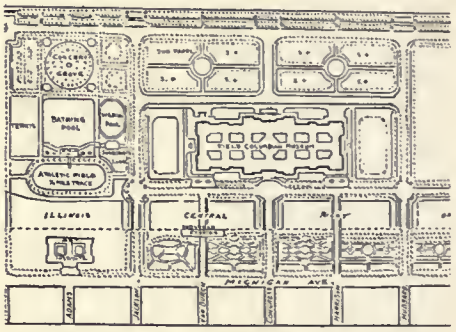
Library:

From: Robert F. Inger, Homewood, Ill.; Henry W. Nichols (bequest), Chicago; Vassar College, Poughkeepsie, N.Y.; Charles B. Cory, Jr., Homewood, Ill.; Karl P. Schmidt, Homewood, Ill.

FIFTY YEARS AGO AT THE MUSEUM

Compiled by MARGARET J. BAUER

The original plan for establishing the Chicago Natural History Museum building in Grant Park in close relation to the Art Institute of Chicago and the subsequent vicissitudes undergone by the plans for the institution (then known as Field Columbian Museum) that resulted in its present location form an interesting part of the history of



MUSEUM PLAN IN EARLY 1900's

Map shows the one-time proposed site for what was then known as Field Columbian Museum. The new building was to have been located on the lake front east of Michigan Avenue between Van Buren and Harrison Streets, but this plan was later discarded for the present location.

the Chicago Plan. The accompanying illustration from a newspaper of the early 1900's shows one of these plans. The decision was reached to keep that part of Grant Park free of further large structures for the sake of the view from Michigan Avenue. The present Museum building is on lake-front land not then in existence.

NEW MEMBERS

The following persons became Museum Members between May 16 and June 15:

Contributors

Charles B. Cory, Jr.

Associate Members

W. S. Deeming, Kenneth M. Henderson, Costa A. Pandaleon, Mrs. Arthur C. Prince, E. Hall Taylor.

Annual Members

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Members are requested to inform the Museum promptly of changes of address.

SPIRITUALISM AS PRACTICED BY AMERICAN INDIANS

BY DONALD COLLIER

CURATOR OF SOUTH AMERICAN ETHNOLOGY AND ARCHAEOLOGY

AT ALL TIMES and in all places man has striven for emotional security by seeking through supernatural means knowledge of the unknown and therefore dangerous future, or knowledge hidden by the barrior of space (distance). Such contemporary and widespread practices as the reading of cards, tea leaves, palms, and horoscopes, and the summoning of spirits through human mediums go back very far in the history of civilization. Historically connected or analogous practices have existed in ancient and modern times among peoples all over the world.

Spiritualism, or communication with the spirits of the dead, is still widely practiced in America and Europe. Such eminent men as Sir Oliver Lodge and Sir Arthur Conan Doyle were firmly convinced of the reality of spiritualistic phenomena. In this country groups in the most varied walks of life often attempt to solve their problems and look into the future by consulting mediums.

THE 'SHAKING TENT'

The North American Indians, too, had their troubles and worries. And one of the ways that they solved their problems was by consulting spirits through an intermediary shaman or medium. The Indian ritual in which the spirits are consulted is called the "Shaking Tent" rite, a name derived from the fact that the tent or booth on which the medium sits is shaken violently by the spirits during the seance. The shaking tent rite was, and to some extent still is, practiced by the Forest Algonkians (Montagnais, Cree, Ojibwa), the tribes of the Plains (Plains Cree, Assiniboine, Gros Ventre, Blackfoot, Crow, Cheyenne, and Kiowa), and the Kutenai of the Plateau.

Among the Forest Algonkians the medium is a man who has gained in a dream revelation the power to summon spirits. The spirits called are the spirits of certain animals, such as turtle and elk, and independent spirit beings, neither animal nor human. Occasionally human ghosts are summoned.

The seance takes place at night in a special barrel-shaped lodge or booth built for the occasion. It is about four feet in diameter and seven or eight feet high. The framework of vertical poles set in the ground and held by horizontal hoops is covered with skins or canvas. During the seance the medium sits within the booth out of sight of the audience ranged on the ground around the booth.

THEY TELL ALL

From the moment the medium enters the booth and throughout the seance, which often lasts several hours, the booth shakes and vibrates. This vibration is believed to be caused not by the medium but by the spirits summoned, and especially wind spirits. The spirits speak, ask what is wanted of them, and when told by the medium, give the answer immediately or after leaving for some minutes in order to obtain the desired information.

With the aid of his spirit helpers a medium is able to secure news of persons hundreds of miles away and to learn of events at a distance. He may recover lost or stolen articles, or determine the fate of missing or overdue persons. And he can discover the cause of and prescribe the remedy for some puzzling maladies.

Among some of the tribes mentioned the shaman, in order to demonstrate his powers, has himself firmly bound with thongs before he is placed in the seance lodge. At once the lodge begins to vibrate, he is freed by his spirit helpers, and the thongs are tossed violently through the open top of the booth.

DELIVER THE GOODS

Some of the shamans were famous for their extraordinary feats. One medium sent his spirit helpers with a load of furs many miles to a trading post from which they brought back within an hour several cases of whisky. Another, during a time of famine, produced in exchange for four marten skins a fifty-pound sack of flour that his helpers had brought from a post a hundred miles away. In another case a shaman is said to have produced fresh blueberries at a seance in the dead of winter.

Among the Plains tribes a special booth was not used. The seance took place in the tipi of the medium, who was concealed behind a curtain. Animal spirits were not summoned but only human ghosts. The shaman was bound with thongs and was released by the ghost. The arrival of the spirit was announced by sounds of wind, shaking of the tipi, and strange voices, which only the medium could interpret. With the aid of his ghost helpers the medium could locate lost objects and stray horses, determine the fate of missing parties of warriors, locate herds of game, determine the position of enemy groups, and foretell future events. But the shaking tent rite was much less important here than among the Forest Algonkian tribes.

THIS MONTH'S COVER

Our cover shows the U. S. Fish and Wildlife Service's research ship "Oregon" on her way into port at Pascagoula, Mississippi. The Museum has received important additions to its collections through the co-operation of this government division which has permitted scientists from this institution to participate in the cruises. An account of recent work by Loren P. Woods, Curator of Fishes, appears on page 3. In the near future it is expected that Mr. Woods and Robert F. Inger, Assistant Curator of Fishes, will be aboard for exploration in the vicinity of the Florida Keys and Campeche Banks. The "Oregon" is a converted tuna clipper equipped with large double trawling winch carrying enough cable to trawl at depths of 500 fathoms. Adding to her usefulness in scientific work are other trawls, trolling lines, hand lines and traps, sonic depth recorder, Loran receiver, radio direction finder, deep sea reversing thermometers, and bathythermograph. The photograph is by courtesy of the Fish and Wild Life Service.

Botanist Joins Museum Staff

E. P. Killip, one of America's leading botanists and head curator of the Department of Botany of the United States National Museum at Washington, D.C., until his retirement this year, has been elected by the Board of Trustees of Chicago Natural History Museum as Research Associate in Phanerogamic Botany. He is a recognized authority on several families of plants.

SCOURING THE GULF OF MEXICO FOR FISHES OF THE DEEP SEA

By LOREN P. WOODS
CURATOR OF FISHES

Perhaps the least-known fish fauna in the world is that lying between 100 and 300 fathoms in the sea along the continental shelf. This is a region generally too deep for ordinary commercial trawling operations. In many places reefs and other obstructions render trawling difficult and expensive, and so, except for a very few local attempts, this region has remained one of the least explored, being known chiefly from chance specimens taken from stomachs of other fishes.

ONE OF THE BATFISHES

This fish, designated as Ogcocephalus, lives on the bottom at depths of 60 to 100 fathoms. Its ventral fins have flexible finger-like tips. The rest of the fin is stiff for support as it drags itself on the bottom. In the underside of the bony horn is a pit containing a bulbous bait that may be protruded and used as a lure.

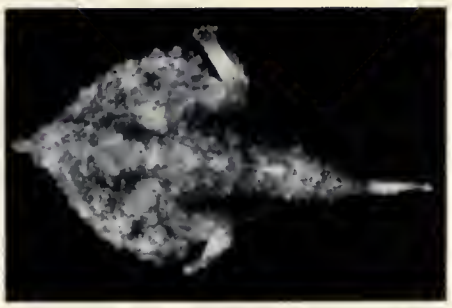
The most striking example of unusual fishes to be found at these depths is the much publicized *Latimeria*, an example of a living Coelacanth fish, a group that had been believed to be extinct since the beginning of the Age of Reptiles. Trawlers working at 40 fathoms a few miles off the mouth of the Chalumna River in South East Africa accidentally caught a large specimen believed to be an inhabitant of the still deeper reefs that lie close to the area trawled.

U. S. RESEARCH SHIPS

As trawling in such depths is expensive and requires a vessel larger than usual with modified gear, fishing companies and fishermen consider exploration of new deep areas too great a gamble. The discovery of deep-water shrimp beds in the Gulf of Mexico has aroused much interest, and the United States Fish and Wildlife Service is devoting considerable time and equipment to exploration. A little over a year ago two tuna clippers belonging to the Fish and Wildlife Service were brought into the Gulf of Mexico to work on the various fisheries and related oceanographic and biological problems. One of these, the *Oregon*, adapted for fishery research, is presently engaged particularly in exploring for new shrimp beds, spotting and catching tuna, and trying and developing new types of fishing gear. This research program is being carried out by Stewart Springer, fishery engineer of the Fish and Wildlife Service, who has for many years made important contributions of specimens to our Division of Fishes.

In February of this year I was invited to participate in the seventh cruise of the *Oregon* for exploratory fishing in the northwest Gulf. During this cruise a search was made for trawlable areas in rather shallow water off the coast of northern Florida between Cape San Blas and Cedar Keys. This part of the cruise was over untried and for the most part coral-covered bottom and resulted in loss or severe damage to six trawls. Since most of the trawling was done at night, days were spent anchored on "snapper lumps," small submerged banks or reefs, handlining at depths from 30 to 60 fathoms. This produced many of the famous and delicious red snappers as well as amberjacks, several kinds of groupers, large moray eels, and smaller species of grunts and snappers.

The *Oregon's* course from Cedar Key to the Mississippi Delta led us across and beyond the 100-fathom line, and here a series of twelve trawls were made in depths from 104 to 305 fathoms. These were by far the most productive and interesting of all the fishing excursions made on this particular cruise.



ANOTHER BATFISH SPECIES

Top view of a smaller kind of batfish. The body is very rough with pits, spines and buckler-like tubercles resembling warts.

Commercially important species such as flounder, tilefish, and silver hake, species important in the mid-Atlantic States and New England trawl fishery, appeared at these depths as well as dozens of little-known smaller species. The New England goosefish, several other kinds of angler fish, snipefish, silvery eels, deep-water sea basses, sea robins, and gurnards as well as numerous kinds of invertebrates were emptied from the trawl onto the deck. The quantity was phenomenal, from 25 to 50 bushels for each time the trawl was dragged.

In the early days of exploring for fishes in the Gulf of Mexico, Silas B. Sterns, an interested owner of a snapper fishery off Pensacola, regularly sent to the Smithsonian Institution any strange fishes taken by his fishermen, particularly specimens found in the stomachs of red snappers. These specimens were usually partially digested, fragmentary, or otherwise damaged and represented but a small portion of the great variety of fishes living on or near the bottom in the depths of 100 to 300 fathoms fished by the *Oregon*. Nevertheless they were named and described, and it was largely on such poor material that our information was based. This has made procuring fresh material in good condition from nearby areas a very worthwhile undertaking for purely scientific reasons.

In this zone conditions of light, salinity, and temperature are relatively constant. Day or night, winter or summer, the differences are so slight as to be scarcely evident. For the animals living in this zone many barriers that affect shore-dwelling forms are not present and wide geographic distribution is the rule. For example, temperatures around 100 fathoms off the coast of North Carolina are practically the same as in the Gulf; many of the fishes taken at this depth are the same also. The deep-water collections made in the Gulf contain many species whose nearest relatives are known to live in South African or Japanese waters at the same depth. This is not so startling as it may seem when we consider that, although the distribution is actually or has been more or less continuous, the intervening areas have not yet been explored.

Although the taxonomic studies of the 900 specimens collected while on the *Oregon* are not completed, more than 150 species have been determined. More than half of these species were not previously represented in the Museum's collections. This is the first time some of these species have been taken in the Gulf of Mexico, and several have been found to be undescribed species. Thus a by-product of very practical fisheries work yields material that eventually, when a sufficient amount has been accumulated, may shed much light on the geographic distribution of fishes and on their abundance and conditions of life on the sloping, muddy banks so far beyond our sight.

SNIPEFISH

Its impressive scientific name is Macrorhamphosus scolopax. It was captured with a 65-foot wedge trawl off the bottom in water of 112 fathoms. Its mouth is a very small opening right at the tip of the tube-like snout. When alive it is semi-transparent pink and silver. It is about four and one-half inches in length on the average.

PLAINS INDIANS RECORDED THEIR STORY IN PICTOGRAPHS

By GEORGE I. QUIMBY
CURATOR OF EXHIBITS, ANTHROPOLOGY

LIKE OTHER INDIANS of North America the Plains Indians did not have true writing. However, they were able to keep rather crude records of events and ideas by means of pictures painted on animal skins. Such pictographic or picture-writing was concerned with calendars, census counts, and biographical records of famous chiefs and warriors.

Calendrical records were primarily historical accounts of the outstanding events of the summer and winter of each year. The census records consisted of the names of Indians in a given tribe or band. For instance, to record the name of an Indian called Running Horse there would be a simple picture of an Indian's head and near it a picture of a horse running. Sometimes the name picture would be enclosed in a cartoonist's balloon and/or connected to the head by a line.

LIKE CAMPAIGN RIBBONS

The biographical records were particularly interesting. They recorded the military exploits of chiefs and notable warriors. They were painted on shirts, robes, tipi curtains, tipi covers, and shield covers made of animal skins. Such biographical records performed in part the same function as modern military medals and campaign ribbons, for one could quickly tell from the record the battles, wounds, exploits, and bravery of the warrior. Moreover, such records were proofs of a warrior's status and achievement because in recounting his deeds of bravery, he could point to the pictographic account—a picture record that everyone of his fellow tribesmen could understand.

Often such picture records were autobiographical—that is, the warrior painted them himself. Public opinion, however, prevented him from claiming any deeds that had not been witnessed or proved by possession of enemy scalps and horses or other visible means.

In the collections of Chicago Natural History Museum there is a good example of a biographic record painted on skin. On a large tipi-curtain collected for the Museum in 1904 by James Mooney there is a pictorial biography of Bushyhead, a Cheyenne warrior who was in his prime in the latter half of the 19th century.

This biographical painting contains eleven episodes in the military life of Bushyhead. The first episode shows Chief Bushyhead dressed in Spanish style with two companions killing three mounted soldiers. One soldier, on the ground, is aiming his carbine at Bushyhead while Bushyhead, also armed with a carbine, strikes the soldier with a bow. The act of striking or touching an enemy with a bow brought great honor to the warrior. It was also an act exhibiting extreme contempt for the enemy.

In the second episode the valiant chief apparently raided a Sioux camp and with his cavalry saber killed five enemy warriors. In this fight Chief Bushyhead, dressed in a Cheyenne warrior's regalia, was not injured, but his horse was twice wounded by arrows.

In episode No. 3, Chief Bushyhead, wearing full regalia for war and carrying his bow and arrow, lance, and shield, is shown escaping from the enemy in a hail of bullets and arrows. His horse has two wounds, but Chief Bushyhead, as usual, is uninjured.

Episode No. 4 shows the chief in warrior's dress and armed with a lance about to kill a Sioux warrior. The Sioux has shot an arrow into Bushyhead's shield of tough buffalo hide.

SCALPS HIS ENEMY

The fifth episode shows Bushyhead scalping a fallen enemy. The victim had wounded

A LIFE STORY IN ELEVEN PICTURES ON ANIMAL SKIN

This record of the deeds of a Cheyenne warrior chief will be exhibited in a hall now in preparation in the Department of Anthropology.

Bushyhead's horse with his gun which lies on the ground beside him, Bushyhead's bow and arrows are in the case that temporarily he has fastened to the horse's reins to keep the horse from wandering off while Bushyhead works on the enemy scalp.

In the sixth episode the warrior chief, wearing a feathered war bonnet and carrying a feathered shield, is shown with two Sioux warriors that he has captured or is about to capture.

Episode No. 7 shows Chief Bushyhead, armed with lance and shield, and mounted on a horse captured from the Sioux, in the act of killing an enemy, perhaps a Pawnee chief.

In episode No. 8 he kills with his lance and pistol a Sioux warrior who is hiding in the bushes. The Sioux warrior is carrying a gun.

ALWAYS VICTORIOUS

Episode No. 9 shows him killing an enemy, probably a Crow warrior. Bushyhead, mounted on his horse, is armed with lance and bow and carries his shield of buffalo hide. The Crow warrior is carrying a gun.

The tenth episode shows Chief Bushyhead, mounted on his horse and armed with lance and shield, about to kill a mounted Pawnee warrior who is armed with a bow and arrow.

Episode No. 11 shows a battle between the chief and a Sioux warrior. Bushyhead is on his horse and is armed with lance and shield. The Sioux is armed with a pistol. Naturally, Bushyhead killed the Sioux.

The above interpretation of Chief Bushyhead's military career from pictographic paintings is a typical example of a Plains war record. Such pictographic presentation is reminiscent of the pictorial art of the Mexican codices and possibly the two pictorial systems are remotely related.

EL SALVADOR STRIVES FOR SCIENCE GOAL

By ADOLPH MEYER-ABICH

A new institute for scientific research in the tropics was founded last year in El Salvador, Central America, with the approval of the president of the republic and with the active participation of interested circles among the population. The buildings of the institute are to be located in the ninety-acre campus of the "University City," at the edge of the city of San Salvador and at the foot of the volcano of the same name.

El Salvador is the smallest but also the most densely populated of all American republics. The country is about the size of Switzerland (or twice the size of New Jersey), and there are about two million inhabitants. It is a product of volcanic action, five volcanoes being shown on its coat of arms. One of the volcanoes, Izalco, is constantly active, and for this reason is known as "the Lighthouse of Central America" to sailors, who see its glowing peak far out at sea. Several other volcanoes are quiescent at the present time but are by no means to be regarded as extinct.

El Salvador represents the Pacific slope of the section of middle-America whose Atlantic slope is formed by Honduras, which is larger but much less densely populated. Central America may be counted as one of the most interesting tropical regions of the world. This is the meeting ground for the animal and plant life, and indeed the very natures, of the two great American continents. In addition to endemic forms (i.e. forms confined to El Salvador), many plant and animal groups native to North America reach their southern limits in this part of Central America. On the other hand, we may find the northernmost representatives of many South American types. El Salvador has tropical lowland plains, and its mountains exhibit varied altitude zones, so that the tropical, subtropical, and temperate zone forms are assembled close together.

Dr. Meyer-Abich is Technical Director of the Instituto Tropical de Investigaciones Cientificas de la Universidad Autonoma of El Salvador. This article, translated from his account in German, gives some idea of the needs for scientific research in El Salvador, and the reasons for the Salvadorean project of Chicago Natural History Museum. It shows why this Museum, like other scientific institutions in the United States and European countries, has sent members of its staff to co-operate in the work of the new Central American institution. In this way these men are aiding not only the institute there, but are broadening the research and adding to the collections of the Chicago museum.

As a result of its dense population, the land of El Salvador is naturally quite fully developed for agriculture. The principal export product is coffee. In addition, cotton, rice, tobacco, cocoa, and all tropical fruits are grown. Parts of the seacoast belong to the so-called balsam coasts, where the trees that yield the erroneously named "balsam of Peru" are native. In spite of the density of population, there are still sufficient areas with original vegetation, especially on the Guatemalan and Honduran border, where the mountains reach a height of 10,000 feet, and extensive areas of cloud forest are represented.

The main building of the institute is the first of a group of three associated structures. It contains special laboratories for biology, chemistry, and geology, with the necessary equipment for research in these fields, together with a special library of about 5,000 volumes. It has in addition especially good photographic facilities, and its own press. Additional buildings include a physiological laboratory, a small marine laboratory on the Pacific coast, and a forest station in the cloud forest region.

The second main building is approaching completion and is to provide living quarters for the foreign research scholars taking part in the work of the institute. In addition to the general director, there are two scientific assistants, a secretary, a librarian, a mechanic, two chauffeurs, a gardener, and four servants. The research staff other than the technical director and the two assistants, is to consist entirely of guest scientists from abroad; the institute is equipped to accommodate about ten such visitors. At present there are two guest scientists from the United States, one from France, and three from Germany. Other North American and German research workers are expected in the coming months. These men are guests of El Salvador, and are supplied with transportation by the institute; there are available at present an automobile and a jeep.

SCIENTIFIC LABORATORY IN EL SALVADOR

In this building, when not on trips out into the field, scientists of Chicago Natural History Museum assigned to the Salvadorean Project conducted their researches.

OLOMEGA IN EL SALVADOR IS A MECCA FOR WATER BIRDS

By AUSTIN L. RAND
CURATOR OF BIRDS

WE'D LOOKED forward to this trip to Olomega, noted for its water birds. We'd delayed the trip because of the distance from San Salvador, some 164 kilometers along the paved road, and this in our jeep is four and a half hours. We passed the area of the earthquake of the week before, that had destroyed four villages, no more than seeing the ruins through our binoculars, the cracked walls being all the damage the houses along the road had suffered. Flame trees (*palo de fuego*) had recently come into bloom, and the almost incredible orange red of their blooms massed in the tree tops was startling in its brightness.

The lake lies only some eight kilometers off the highway, and the road is safe, though slow. A village, called Olomega, lies at the southeast corner of the lake and here we had our first view of the water. It's a fishing village, dirty and odorous, on a flat sloping shore. Here we hired a canoe and guide and put out.

Before I mention the birds that swarmed I should briefly mention the lake. It is some four or five miles across with a shallow sloping north and west shore, with the Volcano of San Miguel looming up beyond, and the steep, rugged Colinas de Jucuaran rising to south and east, rugged, wooded, uninhabited, shutting the lake off from the sea.

EVEN CANOE GOES AGROUND

It's a shallow lake—ibis and herons were wading several hundred yards out in the water, and to travel about by canoe we had to skirt the shore far out. Once, 200 yards from shore we ran aground in the few inches of water the dugout drew.

As we walked down to the lake, the first bird that caught our eye was a red-winged blackbird flying along the lake shore with its red epaulets gleaming against the black of its plumage in the tropical sunlight. There were grackles, too, but they're everywhere in El Salvador so we paid them little heed and hastened on to the water's edge. Here two birds vied for our interest: the jacanas and the stilts. Each is adapted for marsh life, but in a different way. The jacanas are rail-like marsh birds with short legs but very long toes and toenails. Obviously their feet are adapted for their habit of running about over the floating marsh vegetation, and thanks to the size of their feet, it takes less dense marsh vegetation to hold them up than it would most birds. Side by side with the jacanas or lily trotters were black-necked stilts. But their modification is in the direction of long legs (as one might guess from their name); they wade in the water while the jacana walks on the rafts of vegetation.

The jacanas are blackish and rufous birds, but their most striking marking is shown only when they fly, or when they stand with outspread, fluttering wings. Then one sees only the yellow wings.

The stilts, black above and white below, are soberly but elegantly attired. They are still more striking for the grace of their great elongated bills and necks matching long legs, and when they fly you see that their long narrow wings are adequately proportioned.

But we took to our canoe and quickly pushed out. Beyond, it was difficult to estimate how far the lake stretched, for big white birds seemed to be standing everywhere. The first we found to be big white egrets, standing belly deep in the water, perhaps 300 yards from the shore. They were actively fishing, snatching tiny fish from the surface of the water as they walked slowly along. I had noted at Los Blancos on the coast near San Salvador that these birds often, when watching, kept their necks stretched up and out, in a rather strained and stiff looking attitude. But here their necks were all curved in a more graceful manner, and there was material all about me for scores of Japanese screens.

As a member of the Museum's Salvadorean Project, Dr. Austin L. Rand, Curator of Birds, has been engaged in a comprehensive ornithological study of the Central American country, with the co-operation of the Instituto Tropical de Investigaciones Cientificas of El Salvador. Dr. Rand returned to Chicago last month. Herewith is his account of some of the more interesting of the Salvadorean water birds.

Soon we came to wood ibis feeding along with the herons. They are white with black-tipped wings, but a rather dingy white—not the lovely pure white of the egrets. The great, bulky, downward pointing bills of the wood ibis were being used in the same way as the slender, spear-like bills of the egrets—to pick fish from the surface, or near it. Both birds were very tame, and we could put the canoe to within twenty yards of them, and then they flew but a short distance. There were no small egrets out here—the water was too deep for them, but there were a few snowy egrets, little blue herons and one Louisiana heron in close to shore. The little blues, and there must have been several dozen, were almost all in a ragged, mottled plumage, partly the white of the immature plumage, when it looks very similar to the snowy egret except for the dull feet and toes (instead of black with yellow toes) and partly in the adult, slaty plumage, giving them a strange mottled appearance. Both the little blue, and the big egrets were feeding occasionally in a manner rather unusual, but not unknown, for herons. Flying over the water, they swooped down and picked something, presumably fish, from the surface. It was far from a neat performance, with broad flapping wings and trailing legs, but it was apparently effective.

MONARCH OF AIR

Ahead we saw a line of ducks—and then beyond a line of pink that could only be spoonbills. But first a frigate bird, perhaps the most magnificent bird awing, came drifting in over the coastal range to cruise over the lake before disappearing seaward again. It was a young bird, as indicated by its white head and breast, but already its mastery of the air was great. We never saw a wing stroke, nor an opening and closing of the long scissor tail during the time we watched it.

The spoonbills, that showed as a line of pink in the distance, were a disappointment. A few days earlier I had watched a few solitary birds on the mudflats of the coast. They walked about and when they came to ponds, or bits of soft mud, they swung their strange, spoon-shaped bills back and forth through it. This does not seem to be using the spatulate tip of the bill to advantage, for it seems very similar to the manner in which avocets, with slender bills, feed at times. But these spoonbills now were resting quietly along the water's edge in company with some wood ibis that completely dwarfed them. Only once were they as spectacular as I had expected—when we drifted by more than 100 yards off shore and the flock rose with the ibis and settled again, the pink of the spoonbills contrasting with the black and white of the ibis.

Here and there stumps, or stubs, projected from the water, and on them were cormorants. But what interested me about them was their swimming about amid a herd of cattle that were standing in the water. These wild fish-eaters were consorting with cattle, swimming about their legs, just as if they were domestic ducks. This was near a fence that ran out into the lake, and perhaps 100 cormorants were perched on the fence. These birds, with all four toes webbed, were perching not only on the fenceposts, but also on the barbed wire. Sometimes it took a bit of teetering back and forth, but their dexterity was surprising. And when they took off some jumped off backwards, and turned around as they flew away. When flushing from low perches, they pattered off over the surface of the water for a bit before they were air-borne. As they went across the bow of the dugout I was surprised to see they were not running as a duck would, but were making hops,

striking the water with both feet together. Pig ducks I've heard these birds called somewhere, but had never appreciated the name before. Now I did as I heard the grunting noises they made.

ALL ARE 'DUCKS,' EXCEPT DUCKS

Several little grebes (*Colymbus*) were swimming about, but they were inconspicuous. The dark throat and the yellow iris were diagnostic. The boatman pointed them out as ducks, that I should shoot. But here, everything that swims is a duck: the coots, of which a dozen or so were swimming along the shore were "patos"; the cormorants were "patos." Anhingas, that are known to occur but were not seen, are "patos." But when we came to what I call ducks—the whistling tree duck—these the natives called "Pishishi." These are magnificent birds. First a flock came by whistling hoarsely—then I saw them on the water. The sun shines on their golden buff plumage until their brilliance rivals that of the spoonbills.

There were other things conspicuous, too: turkey vultures and caracaras feeding on the water's edge, presumably on fish, washed ashore; on a little grassy island were a dozen or more green herons that flushed one by one as we approached; a pair of bluewinged teal flushed, circled and alighted; a flock of about 20 Franklin's gulls bunched close together on the water; there were shore birds, too, in the marshy shore vegetation. We would have liked to have left the open shore and investigated some of the bays where reedy vegetation grew thick and tall; and the far shore where the forest rose at the water's edge. We knew that boat-billed herons should be here somewhere, as well as tiger bitterns, and that the hills above were the home headquarters of the king vulture populations of El Salvador.

As we put back for the landing and watched the curling crests of the waves whipped up by the freshening wind, marveling at the opaqueness of the green, algae-filled water, we thought that here, if our station was close enough, was material for a couple of months' work all by itself.

STAFF NOTES

Dr. Alexander Spoehr, Curator of Oceanic Ethnology, recently returned from Yale University and other eastern institutions where he has been studying documentary material related to his researches on Micronesia .... **Dr. Theodor Just,** Chief Curator of Botany, has returned from a field trip in Texas and Iowa. He also presented a paper on "The Classification of the Cycadeoidales" before the sixth annual meeting of the Society for the Study of Evolution held in Berkeley, California .... **Dr. Julian A. Steyermark,** Curator of the Herbarium, recently conducted a series of botanical field trips in Missouri. In addition to his Museum explorations, he led a four-day field trip of the Central States Section of the Botanical Society of America into the Ozarks.

BOTANICAL FIELD TRIP COMPLETES WORK

The Museum's 1951 Southwest Botanical Field Trip has returned from five weeks of study and collecting in the vicinity of archaeological sites in New Mexico excavated by the Museum's Southwest Archaeological Expeditions of the past few years. Most of the time was spent near Tularosa Cave, scene of the 1950 operations. The wealth of wild and cultivated plant material unearthed by excavations there made it essential to study the vegetation now growing about the cave. The remains from Tularosa Cave cover a period of about 3,000 years or more and include several roots that could not be identified from herbarium specimens and descriptions of the plants of the region. Dr. Hugh C. Cutler, Curator of Economic Botany, and Jack Reeves, volunteer assistant, collected all the plants now growing in the region of the cave.

CURATOR TO COLLECT FOSSIL FISHES

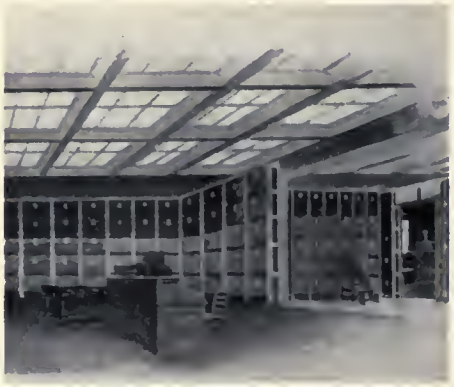
Robert H. Denison, Curator of Fossil Fishes, will spend August on a collecting trip in Pennsylvania, New Jersey, and New York. One of the purposes of the trip is to obtain specimens of the armored, fish-like vertebrates called ostracoderms, that have been found in certain Silurian rocks in these states. They are of particular interest because they are among the oldest known vertebrates, and their structure and occurrence may help to throw light on the early history of this important group. Some time will be spent also in investigating the Late Devonian rocks in western New York state. A great thickness of shales was deposited in this region more than 300 million years ago as muds in the bottom of a sea. These shales have yielded a few well-preserved fishes mostly related to sharks and to a group of heavily armored fishes known as placoderms.

FIFTY YEARS AGO AT THE MUSEUM

Compiled by MARGARET J. BAUER

From the *Annual Report of the Director* for the year 1901:

"It would seem from the permanent improvements recorded each year that the building is gradually being reconstructed. This, as a matter of fact, is true as concerns the offices, laboratories, etc., but the growing needs of the Museum and the expanding processes necessary to meet the demand of the departments are but an index of the development of the entire institution. More and more each year the Museum finds itself equipped to perform all the necessary labor; not only the technical and scientific labor, but the ordinary mechanical work as well, and the circumstances are unusual when outside agencies are employed."



OLD-TIME SCIENTIST'S QUARTERS

Office and laboratory of the Curator of the Department of Zoology when the Museum, located in its former building in Jackson Park, was known as the Field Columbian Museum.

"*The Memberships.*—There still has to be recorded a decrease in the annual memberships, due, as has been previously reported, to the fact that no effort is made to increase the list." (In 1951, as for years past, the membership trend is upward and the total today is close to 5,000. Constant efforts toward further increase are now made.)

SUMMER LECTURE TOURS GIVEN TWICE A DAY

During July and August, conducted tours of the exhibits, under the guidance of staff lecturers, will be given on a special schedule:

Mondays: 11 A.M.—The World of Animals (general survey of the animal exhibits); 2 P.M.—General Tour

Tuesdays: 11 A.M.—Places and People (general survey of the anthropology exhibits); 2 P.M.—General Tour

Wednesdays: 11 A.M.—Green Magic (general survey of the plant exhibits); 2 P.M.—General Tour

Thursdays: 11 A.M. and 2 P.M.—General Tours

Fridays: 11 A.M.—Secrets in Stones (general survey of the geology exhibits); 2 P.M.—General Tour

There are no tours on Saturdays and Sundays.

Books

(All books reviewed in the BULLETIN *are available in The Book Shop of the Museum. Mail orders accompanied by remittance including postage are promptly filled.)*

A FIELD GUIDE TO THE BUTTERFLIES OF NORTH AMERICA, East of the Great Plains. By Alexander B. Klots. Houghton Mifflin Company, Boston, 1951. xiv+349 pages, 8 text figures, 40 plates (16 in color). Price $3.75.

Butterflies rank with birds and flowers in possessing some of the most conspicuous and pleasing colors and designs in nature. The pursuit and study of these little animals is one of the best entries into the natural history of our fields and forests. As with other satisfying avocations, the butterflies can be approached from many points of view and from many levels of interest and knowledge. There is the satisfaction of the hunt, the collecting urge, the beauty of the objects, the lure of the great rarity, the lucky capture of the unexpected, or just the excuse for a pleasant ramble in a natural setting.

The transition to an interest in the butterfly as an organism follows naturally and leads into the interesting aspects of life-history, behavior, and adaptation. Here it is possible for the amateur to make original and important contributions to the knowledge of even our commonest butterflies. The intimate relation between butterflies and flowers, and caterpillars and their food plants, tends to direct the attention of butterfly collectors to plants, and many collectors become amateur botanists as well. Many a distinguished naturalist has been a butterfly collector in his boyhood. For others who have become grocers, stock brokers, or stone-cutters, butterfly collecting has been an absorbing recreation.

For any approach to the North American butterflies, *A Field Guide to the Butterflies of North America,* by Alexander Klots, will be an essential work. The book is a splendid addition to the Peterson Field Guide Series and fills a need not met by any other book. As the title indicates, the book contains descriptions of all the butterflies found in North America, east of the Great Plains, and notes the distinguishing marks of each. More than 400 species are illustrated, 247 of these in full color. The technique of emphasizing the recognition marks of each species, which was used so successfully in a previous work in the series, *A Field Guide to the Birds* by Roger Tory Peterson, adds greatly to the usefulness of the book for quick identification. Additional information on the larvae, food plants, and the range and behavior of each species is given.

The first 60 pages of the book contain a general account of the structure, life-history, and classification of butterflies. Much interesting information is given in a readable chapter entitled "The Butterfly and its Environment." Included in this chapter are such topics as butterflies and plants, protective form and coloration, behavior, butterflies and climate, and conservation. There is also a section on collecting and preserving specimens.

Several useful indexes to the butterflies, larval food plants, technical terms and general subjects, and a check list of the species, add much to the value of the book for quick reference. A short section written for teachers and nature leaders contains much useful information based on Dr. Klots' own experience as a teacher, scoutmaster, and camp counselor.

Dr. Klots and the publishers are to be congratulated on this fine work.

HENRY S. DYBAS
Associate Curator of Insects

Technical Publications

The following technical publications were issued recently by Chicago Natural History Museum:

Fieldiana: Zoology, Vol. 32, No. 8. *The Carotid Arteries in the Procyonidae.* By H. Elizabeth Story. May 11, 1951. 84 pages. $1.

Fieldiana: Botany, Vol. 28, No. 1. *Contributions to the Flora of Venezuela.* By Julian A. Steyermark and Collaborators. May 18, 1951. 242 pages. $4.

Fieldiana: Zoology, Vol. 31, No. 46. *Remarks on and Descriptions of South American Non-Marine Shells.* By Fritz Haas. July 6, 1951. 44 pages. $1.

NEW MEMBERS

The following persons became Museum Members between June 18 and July 13:

Contributors

James Witkowsky*

Associate Members

Donald R. McLennan, Jr., Miss Lucile Farnsworth Reals, Jr., Charles M. Rhodes, Miss Marilyn Jean Wulf.

Sustaining Members

Bert R. Prall

Annual Members

Herman Balsam, Walter J. Boland, Frederick W. Boulton, G. L. Clements, Howard P. Clements, Jr., Dr. Warren H. Cole, Hitous Gray, Alfred O. Grombach, Bernard H. Heerey, W. W. Huggett, James S. Kemper, Jr., Frank P. Kosmach, Arthur Krausman, Dr. Richard M. Oliver, Benjamin R. Paul, Felix Palm, J. D. Purdy, F. J. Stannard, Park Teter.

* Deceased

TWO CHILDREN'S MOVIES SCHEDULED IN AUGUST

On the first two Thursday mornings in August the Museum will present the final programs in the Raymond Foundation's annual summer series of free entertainments for children. There will be two performances of each program, one at 10 A.M. and one at 11 A.M., in the James Simpson Theatre of the Museum. The theatre and west entrance of the Museum will be open at 9:30 A.M.

Children are invited to come alone, accompanied by parents or other adults, or in groups from clubs and various centers. Admission is free. Following are the dates and titles of the shows:

August 2—BEAVER VALLEY
(a Walt Disney film)
The finest of nature photographers helped to produce this story of the animals and life in a typical beaver pond
Also a cartoon

August 9—SEAL ISLAND
(a Walt Disney film)
This color movie tells about the fur seals of the Pribilof Islands
Also a cartoon

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the past month:

Department of Anthropology:

From: William Ryer Wright, Highland Park, Ill.—2 late blackware pottery vessels, Peru.

Department of Botany:

From: R. Romero Castaneda, Bogota, Colombia—89 phanerogams, Colombia; J. Soukup, Lima, Peru—47 phanerogams, Peru; Dr. H. P. Veloso, Santa Catarina, Brazil—33 phanerogams, Brazil; A. F. Wilson, Flossmoor, Ill.—47 phanerogams, Texas, and California.

Department of Geology:

From: O. A. Gentz, Chicago—star ruby and unpolished crystal, North Carolina; Miss Vida Woley, Evanston, Ill.—carved coral jewelry.

Department of Zoology:

From: John G. Shedd Aquarium, Chicago—20 marine and freshwater fishes; Dr. Philip A. Butler, Pensacola, Fla.—2 preserved fishes, Florida; Chicago Zoological Society, Brookfield, Ill.—3 bird skins; Museum of Vertebrate Zoology, University of California, Berkeley—2 birds in alcohol—California; Museum of Comparative Zoology, Cambridge, Mass.—a collection of non-marine shells, Near East; T. Pain, London, England—a collection of freshwater shells, Dutch Guiana; University of Michigan Museum, Ann Arbor—2 frogs (paratypes).

Division of Motion Pictures:

From: John W. Moyer, Chicago—45 2 x 2 original color slides and miscellaneous material.

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BULLETIN

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Chicago Natural History Museum

Chicago Natural History Museum

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KARL P. SCHMIDT.....*Chief Curator of Zoology*

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Members are requested to inform the Museum promptly of changes of address.

GREAT SCIENTISTS' THOUGHTS ON NATURE AND HUMAN LIFE

I do not know what I may appear to the world; but to myself I seem to have been only like a boy playing on the seashore, and diverting myself in now and then finding a smoother pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me.

SIR ISAAC NEWTON, in David Brewster's *Memoirs of . . . Newton*

Among the scenes which are deeply impressed on my mind, none exceed in sublimity the primeval forests undefaced by the hand of man. No one can stand in these solitudes unmoved, and not feel that there is more in man than the mere breath of his body.

CHARLES DARWIN, in *Journal of Researches . . .* [Voyage of *H.M.S. Beagle*]

To a person uninstructed in natural history, his country or seaside stroll is a walk through a gallery filled with wonderful works of art, nine-tenths of which have their faces turned to the wall.

THOMAS H. HUXLEY, in *Science and Education Essays*

There exists a passion for comprehension, just as there exists a passion for music. That passion is rather common in children, but gets lost in most people later on. Without this passion there would be neither mathematics nor natural science.

ALBERT EINSTEIN

THIS MONTH'S COVER

Schools open in September. This month's cover picture, showing children approaching between two of the entrance pillars of the Museum, is to remind parents, and teachers of all grades from elementary school to the senior class in college, that the portals of the Museum lead to vistas of knowledge which supplement their schoolroom studies. Children, and high-school and college students, may benefit from these scientific resources by coming to the Museum independently, or, as thousands do, in organized school groups accompanied by instructors. The services of the Museum's Raymond Foundation staff of lecturers is available to all such groups.

TECHNIQUE OF DIGGING INTO THE PAST

BY TOM ALDER

MEMBER, SOUTHWEST ARCHAEOLOGICAL EXPEDITION STAFF

The excavation of the Cordova Cave in New Mexico this summer by the Museum's Archaeological Expedition to the Southwest provides an interesting example of the techniques used by archaeologists to uncover the remains of ancient man in America. This marks the seventeenth year that scientists from the Museum have dug into ruins of Indian dwellings in this area.

This season offers possibilities of yielding some of the most interesting results, and certainly the tasks to be done are among the most difficult yet tackled. The very location of the cave has presented a problem from the outset. It is situated more than 1,000 feet above the floor of Pine Lawn Valley on a mountain cliff, and one must undergo an hour's ride on horseback through rugged terrain to reach it from the road.

Before the actual excavation was begun, the floor of the cave was marked out in a series of 2-meter squares to be dug in vertical levels of 20 centimeters to the rock bottom of the cave. This method of surveying permits the objects uncovered to be relocated on a map for purposes of analytical study. This research can be conducted years later, and miles away from the site.

The technique employed in digging follows this procedure:

Each two-meter square is shoveled off by levels, and the refuse is put through a screen to sift out the artifacts. The discoveries are then put into bags which are marked with the square and level at which they were found. As a further distinction, plant material such as wood and corn is put in one bag while pottery fragments, stone tools, and projectile points are dropped in another.

After a hard day of digging, screening, and classifying, the crew must get the day's finds off the mountainside and back to camp. With small, hard objects this is easily done, but large fragile items such as mummies, whole pots, and large skins require painstaking care in transport to avert damage. Once the artifacts are in camp, they are permanently catalogued on special cards

ARCHAEOLOGISTS EXPLORE CAVE

Initial trench opening into mouth of Cordova Cave, New Mexico, which is being excavated this season by members of the Museum's Archaeological Expedition to the Southwest. Every inch at each level of digging is carefully combed for specimens.

which carry data such as dimensions, type, and use. The various objects are then packed and shipped to Chicago where they become pieces in the gigantic puzzle of Southwestern Indian civilization which scientists are just beginning to solve.

NEW MEMBERS

The following persons became Museum Members between July 16 and August 15:

Associate Members

Paul Bechtner, William F. Borland, Dr. Winston I. Breslin, L. L. Stephens.

Non-Resident Associate Members

Elmer G. Carlson

Annual Members

Robert N. Avery, Ray H. Boland, C. Wayland Brooks, Homer A. Burnell, Willard W. Cole, Lee Cooper, John Doctoroff, Philip Doern, Gillette A. Elvgren, Newton L. Fausey, Robert E. Gooding, Martin C. Huggett, Harvey Kaplan, Sidney M. Keller, George N. Lamb, John G. Lambertsen, Donald B. Martin, Ralph G. Newman, Harry J. O'Haire, Hunter K. Orr, Charles D. Preston, Dr. Frederick W. Preston, Donald Purdy, R. S. Saunders, Russell J. Turney, Errett Van Nice, Dr. Philip H. Wyckoff.

DIORAMAS, COLOR FEATURED IN NEW EARTH HISTORY HALL

By EUGENE S. RICHARDSON, JR.
CURATOR OF FOSSIL INVERTEBRATES

On the evening of October 1, Frederick J. V. Skiff Hall (Hall 37), in which are shown fossil plants and invertebrates, will be formally reopened; beginning October 2 it will be available to the general public. The old exhibits of these subjects, formerly occupying part of the same hall, have been removed and most of the specimens placed in the study collection. There they may, of course, still be examined by persons interested.

Outstanding features of the new hall are spaciousness both in the arrangement of cases and of exhibits in them, tasteful use of color, and clarity in presentation of subject matter, with emphasis on dioramas.

As a preview of the contents of the hall, the illustration accompanying this article shows one of the ten habitat groups made by sculptor George Marchand, of Ebenezer, New York.

The diorama illustrated represents, in natural size, some of the 345 species of animals known to have lived in the Gulf of Mexico late in the Cretaceous period, 100-million years ago. At that time, the Gulf extended up the Mississippi Valley into southern Illinois. Fossil shells of the animals represented and of many others have been collected from clay deposited in the ancient Gulf and now exposed in the banks of Coon Creek, in western Tennessee. George Langford, Curator of Fossil Plants, and the writer visited that locality two years ago to collect shells for the restoration.

This group illustrates particularly well the ceaseless feeding activity at the bottom of the sea, based on plants as the fundamental food. Clams and oysters eat microscopic plants and microscopic animals that have eaten microscopic plants; snails eat the same plus seaweed, clams, and oysters; and large ammonites with grasping tentacles capture all three kinds of slower shellfish. These in turn must die, providing nourishment for more plants, and perpetuating the cycle.

The group also illustrates the artistic quality of Mr. Marchand's work, though the color, an important aspect of the whole, cannot be appreciated from the picture. In making a restoration, the artist must start with only the shells or other hard portions of the animals. To supply the soft, fleshy parts of an extinct animal, he must study the appearance of related living forms. The color of the models is necessarily imaginary, for color is almost never preserved in a fossil. But by a process of logic it is made similar to that of the living representatives of the same group, besides being chosen to blend or contrast pleasingly with the rest of the exhibit.

(*Continued on page 6, column 3*)

HUNTERS AND PREY 100 MILLION YEARS AGO

Life-size models of ammonites, clams and snails—one of the new habitat groups in Frederick J. V. Skiff Hall (Hall 37) which will be reopened as a completely new hall on October 1, with a special evening preview for Members of the Museum. The ancient animals depicted above, like their present-day relatives, spent their time seeking and capturing food. Just as in the modern "web of life," plants formed the basic food even of the flesh-eating creatures.

MUSEUM MEMBERS' NIGHT SET FOR OCTOBER 1

A special Museum Members' Night, for which all members shortly will receive formal invitation cards, will be held on Monday evening, October 1, at 8 o'clock. The occasion marks the formal reopening of Frederick J. V. Skiff Hall (Hall 37) in which a three-year task of completely revamping the entire presentation of the fascinating subject of fossil plant and invertebrate animal life has just been completed. The hall is now, in effect, completely new, with all old methods of display thrown out in favor of series of bright, colorful and dramatic exhibits which present the story of millions of years of prehistoric life in an easily followed continuity. Outstanding are the many dioramas in which the weirdest creatures of a dim epoch are recreated three-dimensionally amid restorations of scenes on the primeval earth on which they lived.

Guests will also have opportunity to see the color motion picture film "Through These Doors," which tells the story of Museum activities. They will also be taken on inspection tours of the offices, workrooms, and study collections on the third and fourth floors of the Museum.

FIFTY YEARS AGO—AND TODAY—AT THE MUSEUM

By KARL P. SCHMIDT
CHIEF CURATOR, DEPARTMENT OF ZOOLOGY

ON SEPTEMBER 16, 1951, William J. Gerhard, Curator Emeritus of Insects, passes the landmark of fifty years of service to Chicago Natural History Museum.

A great museum director, Joseph Grinnell, wrote an essay with the title *The Museum Conscience*, in which he set forth the peculiar importance of detail (and thus of routine) in a museum of natural history. In such a museum the most basic of functions is the multiplicity of duties of a curator in relation to the general public, to the very special public composed of his colleagues, and finally to his special science—we may count all this as secondary to his example of unselfish and self-effacing service and to the living exemplification of a "Museum conscience."

When Mr. Gerhard came to the Museum in 1901 the total staff in Zoology comprised

MUSEUM VETERAN CONTINUES RESEARCH

William J. Gerhard, Curator Emeritus of Insects, collating specimens from a recently acquired collection and transferring them to new type of drawers used in this division. The background is formed by the division's pamphlet library, which like the insect collection in his charge, has benefited from Mr. Gerhard's meticulous care during 50 years of Museum service.

preservation of its materials, its specimens, which constitute basic records of past work or provide the data for future studies. These collections and the records that accompany them require meticulous and continued care. It is this function that requires the museum conscience, and it is only those who have it who deserve the special museum title of curator. It is a term whose connotation of honor Mr. Gerhard's fifty-year career has enhanced. Much as all of us on the staff have learned from him about the collection and preservation and preparation of specimens, about the care of the Museum's Library, about the keeping of the Museum records, and about the labeling and installation of exhibits—as well as about the the head of the Department, D. G. Elliot; S. E. Meek, in charge of fishes and reptiles; Charles B. Cory, Curator of the then separate Department of Ornithology; Carl E. Akeley, Taxidermist-in-Chief, and Edmund Heller, field collector. Mr. Gerhard was most urgently needed, not only for the insects, but to assume charge of all the vast hosts of other invertebrate animals. The staff of the Department now nunbers 22, in addition to full-time and part-time research associates, and the Division of Insects has held its own in this fifty-year growth, for it now has a staff of three in addition to Mr. Gerhard, plus a curator of the now separate Division of Lower Invertebrates.

The growth in the staff of which Mr. Gerhard is now the dean represents perhaps the most significant kind of growth in a museum, for the collections become significant only as they are used. But the effectiveness of the staff in turn depends on the collections available for exhibition and study. The first really great accession of insects was the aquisition of the Strecker collection of butterflies and moths, consisting of more than 50,000 specimens. Mr. Gerhard supervised the packing and shipping of this collection (including the accompanying library) from Reading, Pennsylvania, in 1908. It is thus singularly appropriate that he should now be occupied with the transfer of these specimens to the new cases made possible by the major expansion of the divisional quarters now in progress. The reference collection of insects and related groups has grown, under Mr. Gerhard's curatorship, from a few thousand to more than 600,000 specimens.

WELCOMED YOUNG SCIENTISTS

An especially important feature of the Division of Insects under this fifty-year regime has been the encouragement of young entomologists. The Museum may take an especial pride in the distinguished twofold career of William M. Mann, first as a famous professional entomologist and then, by exchange of avocation for profession, and of profession for avocation, as Director of the National Zoological Park in Washington, D.C. Dr. Mann's interests were encouraged and his ambitions became clear under the guidance of Mr. Gerhard at this Museum. He writes of his application for a job at this Museum: ". . . the door was opened by a slight, pleasant, dark-haired man. His name was William J. Gerhard, and meeting him was the most fortunate episode of my youth as well as the beginning of a great friendship that has never diminished." Mr. Gerhard's welcome to young entomologists who came to the Museum, and his teaching by unobtrusive advice and by example have, in fact, evolved two members of the scientific staff who essentially grew up in the Division of Insects with him—Rupert L. Wenzel, Curator of Insects, and Henry S. Dybas, Associate Curator of Insects.

When I came to the Museum in 1922, good fortune located me in an office opposite to that of the Division of Insects, in charge of Mr. Gerhard. I was a novice in the museum world, and of course entirely unacquainted with the special procedures and special peculiarities of the then Field Museum. My neighbor across the hall proved to be the sympathetic guide, counselor, and friend that I needed. I could have had no better fortune for my induction in the department, for Mr. Gerhard's time was endlessly and unselfishly at my service. I could not fail to observe his careful attention to the most trivial question from a child or from a casual visitor; and it did not escape me that he enjoyed an extraordinary degree

of respect from visiting entomological colleagues who had occasion to work with the insect collections.

TOP AID TO CHIEFS

Mr. Gerhard had long before taken over much of the departmental routine, serving without title and without adequate recognition (as far as I could discern) as assistant to the Chief Curator, and often as Acting Chief Curator. These departmental duties, quite distinct from those of the Division of Insects, seem to have begun with his arrival at the Museum in 1901, when the head of the department was Daniel Giraud Elliot. Mr. Gerhard has continued these services through the regimes of the succeeding chief curators.

It is one of the most important of the functions of a museum that it provides for continuity of its material collections in a fashion and fad-ridden world. As William J. Gerhard, now senior member of the staff, looks back on fifty years of work in one of the great museums of the world, he may take more than usual pride in his long career, for it has been in the best museum tradition of continuous service. Certainly the Museum takes more than usual pride in a distinguished Curator of Insects who entered its doors for the first time fifty years ago.

LECTURES ON SATURDAYS BEGIN IN OCTOBER

The Museum will open its annual Autumn Course of free illustrated lectures on science and travel for adults on Saturday, October 6, with "Virginia" by Edward F. Cross. Color motion pictures will accompany the lecture.

Lectures will continue on Saturday afternoons throughout October and November. A complete schedule will appear in the October BULLETIN. All lectures begin at 2:30 P.M. and are given in the James Simpson Theatre of the Museum. Reserved seats are available to Museum Members by arrangement in advance, either by mail request or telephone (WAbash 2-9410).

SEPTEMBER LECTURE TOURS, DAILY EXCEPT SUNDAYS

Tours of exhibits, under the guidance of staff lecturers, are conducted every afternoon at 2 o'clock, except Sundays and certain holidays. On Mondays, Tuesdays, Thursdays, and Saturdays, general tours are given covering all departments. Special subjects are offered on Wednesdays and Fridays; a schedule of these follows:

Wed., Sept. 5—Before the Dawn of History (*Lorain Stephens*).

Fri., Sept. 7—Your Vacation in the West: Indians, Plants, Animals. Illustrated introduction in Meeting Room (*Marie Svoboda*).

Wed., Sept. 12—The Primitive Traveler (*June Buchwald*).

Fri., Sept. 14—Adventures Behind a Great Museum. Illustrated introduction in Meeting Room (*Lorain Stephens*).

Wed., Sept. 19—Adapt or Become Extinct (*Jane Sharpe*).

Fri., Sept. 21—Indians of the Chicago Region, in the period before the city was founded. Illustrated introduction in Meeting Room (*June Buchwald*).

Wed., Sept. 26—Fossil Facts (*Anne Stromquist*).

Fri., Sept. 28—Nature's Fall Color Show. Illustrated introduction in Meeting Room (*Miriam Wood*).

There will be no tour Monday, September 3, on account of the Labor Day holiday, but the Museum will be open.

STAFF NOTES

Karl P. Schmidt, Chief Curator of Zoology, was elected vice president for 1951–52 of the Society for the Study of Evolution at the recent annual meeting held in Berkeley, California. He resigned from the treasurership which he has held for the last five and a half years .... **Dr. Theodor Just**, Chief Curator of Botany, will participate in a symposium on "Phylogeny and the Fern-Pteridosperm Complex" at the meeting of the American Institute of Biological Sciences to be held in Minneapolis September 10–12. His contribution to the symposium will be a paper entitled "The Geographical Distribution of Fossil Ferns and Pteridosperms." He will also present a paper, prepared in collaboration with Dr. José Cuatrecasas, Guggenheim fellow, on "Synopsis of Fossil and Living Humiriaceae."... **Miss Audrey Greeley**, a recent graduate of Rosary College school of library science, has joined the reference staff of the Museum Library .... **Dr. Julian A. Steyermark**, Curator of the Herbarium, has been conducting a series of collecting trips in the Ozark region of Missouri .... **Dr. Paul S. Martin**, Chief Curator of Anthropology, recently gave an illustrated lecture on the work of the Museum's Archaeological Expedition to the Southwest, before a large group of residents of Reserve, New Mexico, a town near the expedition headquarters.

Noted Scientists Visit Museum

Among noted scientists who have recently visited the Museum are: Dr. Ralph Linton, Sterling Professor of Anthropology, Yale University; Dr. Cornelius Osgood, Professor of Anthropology, Yale; and Dr. Karin Hissink of the Frobenius Institute and Museum for Ethnology, Frankfort-am-Main, Germany. Dr. Linton formerly was Curator of Malaysian Ethnology at this Museum.

BIRD PAINTING EXHIBIT, SEPT. 15—OCT. 15

"Song Birds of America," a series of twelve paintings by the noted artist, John Atherton, will be presented as a special exhibit in Stanley Field Hall of the Museum from September 15 to October 15 inclusive. The canvases, 25"x25" and framed, include the following popular birds: wood thrush, mockingbird, cedar waxwing, chickadee, Baltimore oriole, cardinal, bluebird, flicker, meadowlark, warblers, red-winged blackbird, and bobolink.

The exhibition of these paintings will correspond virtually with the peak of the annual migration of birds to the south.

Atherton, the artist, is well-known in the fields of both creative painting and commercial art. Some of his works hang in the Art Institute of Chicago, and in three New York institutions: Museum of Modern Art, Whitney Museum of American Art, and Metropolitan Museum of Art. He now lives and works in Arlington, Vermont.

PAINTING IN SPECIAL EXHIBIT

Red-Winged Blackbird, one of the twelve oil paintings by John Atherton to be shown at the Museum September 15–October 15.

The exhibition of the bird paintings at the Museum is by courtesy of John Morrell & Company of Ottumwa, Iowa, which owns the series.

Free Programs for Children To Begin October 6

"Wonderland Tales," a film of stories about animals and boys and girls, is scheduled as the first of the Raymond Foundation's Autumn Series of free motion picture programs for children. It will be presented on Saturday morning, October 6, at 10:30 A.M. in the James Simpson Theatre of the Museum. Programs will continue on Saturday mornings throughout October and November. The October BULLETIN will contain a complete schedule.

On September 4, the day after Labor Day, autumn visiting hours, 9 a.m. to 5 p.m., go into effect, continuing until October 31.

BIRD-PARASITE STUDY AND AVIAN RESEARCH

By AUSTIN L. RAND
CURATOR OF BIRDS

The entomologist shown in the photograph picking lice off a bird skin is a graduate student of the University of Chicago, Ronald Ward. The ornithologist looking on is Emmet R. Blake, our Associate Curator of Birds, who has just taken the bird skins out of the case where they are filed in the Museum.

The insects in which Mr. Ward is interested are Mallophaga. (Mallophaga, pronounced mal-lof'-a-ga, is a more exact as well as a more euphonious name for what some people call bird lice.) Mallophaga live chiefly amongst the feathers of living birds, eating feathers and dermal scales and apparently doing the birds little harm. When the bird dies, the Mallophaga die too and may remain on the dead bird.

COLLABORATION IN RESEARCH
Emmet R. Blake (left), Associate Curator of Birds, and Ronald Ward, University of Chicago graduate student, work out problems of bird parasites.

To collect Mallophaga for study one must first, of course, catch the birds. This is where the Division of Birds assumes importance for the Mallophaga expert. We have already collected birds, more than 200,000 specimens, and have filed them in our steel cases for study. On some of these specimens there are still Mallophaga that infested the birds when they were alive. An interesting point here is that recently a new species of Mallophaga was removed from a specimen of a passenger pigeon and described many years after the bird was extinct.

Our collection has proved to be a fruitful hunting ground for Mr. Ward. He uses tweezers and brush for removing the insects and a magnifying glass for examining these little parasites, many of which may be as small as one-twenty-fifth of an inch. His prizes he files in vials of alcohol for study.

A record is kept of just where each specimen is found on the bird. Though the habitat formed by the warm close cover of the bird's feathers might be thought to be uniform from the view of an insect living in it, it has been found that certain Mallophaga may live only on one part of the bird, the neck for example, and another species perhaps under the wings. This needs to be checked. This is an elementary ecological study, comparable to mapping the distribution of birds in a forest where some species live in the tree tops, others in the undergrowth, and so on.

An expert, looking at specimens of Mallophaga, can sometimes tell what part of the bird they came from. For instance, short, broad ones live on the neck; long, narrow ones on the wings. This is adaptative modification to fit the insect to its life in the particular part of the bird's plumage it inhabits.

SYSTEMATIC RELATIONSHIPS

The classification of the various species of Mallophaga has a bearing on the classification of birds. The generations of Mallophaga pass from parent bird to young bird. There is little chance for the Mallophaga parasitic on one species of bird to pass to another bird species. In the cozy isolation of its feathery host, the Mallophaga are differentiated. Those on each kind of bird have the chance to become a different species. As the birds speciate, the Mallophaga may do the same. One would expect the most closely related birds to have the most closely related Mallophaga on them, while more distantly related birds would be expected to have Mallophaga that showed less relationship.

There is evidence that this is sometimes the case. Thus, when the systematic relationships of a group of birds are in doubt, as in the case of the jacanas that show relationships to the shore-bird order and the rail order, or the flamingoes that have been considered related to the ducks and also to the herons and storks, the Mallophaga may furnish an additional bit of evidence. This can be taken along with the characters of the habits, the eggs, the nest, the young, the plumage, the bone, and the tissue of the bird. These are all weighed together, and the bulk of the evidence determines the final conclusion.

The entomologist's primary object may be the taxonomy of the Mallophaga. The ornithologist's interest in getting together his collection is avian taxonomy. But both come together in the Museum, helping each other. Working together they build better and higher than can either alone.

To the true scientist, there is no natural object unimportant or trifling. From the least of Nature's work he may learn the greatest lessons. —*Sir John Herschel*

EARTH HISTORY HALL—

(Continued from page 3)

Seaweeds are present in most of the groups, though they are generally not recognizable in collections of fossils, where they are represented by rather shapeless black marks. In the group shown here, Mr. Marchand has used his artistic license to produce a dramatic seaweed giving a strong, dynamic effect to the whole composition. It is a proper accessory for the slender ammonites swooping greedily upon the sluggish mollusks below.

The ten habitat groups and the 43 other cases cover the subject of geologic history as disclosed by the fossil plants and invertebrates with a completeness not previously attempted. The hall, as the public will see it after October 1, is probably the most elegant and extensive display yet given to its subject.

The new exhibits include 1,339 specimens. Though we neglected to count the specimens in the old cases, it is apparent from a contemporary photograph that several of the individual cases must have contained more than that number of specimens. Thus the new exhibits achieve spaciousness. This is seen also in the arrangement of the cases. The 36 cases of fossils and 39 cases of ores formerly seen in Hall 37, a total of 75, have been replaced by 53 newly built cases. The increased use of the Museum by guided groups dictated the wider spacing.

Besides introducing space, we have added color in backgrounds as well as specimens. Suiting the generally marine environment of the fossils, the backgrounds of the exhibits are blue or green. Specimens are invisibly fastened to the background, and essential information about them is given in raised letters of a different color. The letters were first laid out in the form of the words to be used, and then sprayed with artists' color by a Geology Department preparator, and each one was then individually glued in place to make the headings and labels. Except for pink and black, every color has been used on the 60,000 letters.

The specimens and the letters are not the only things occupying the 2,325 square feet of case area. There are 46 original oil paintings by John Conrad Hansen, 34 painted maps and 43 drawings, mostly by Mr. Hansen, 24 diagrams, and 86 models. The diagrams, several of them the full size of a case and serving as background for fossils, are principally the work of Harry Changnon, Curator of Geology Exhibits. Models of animals were made by Joseph B. Krstolich, Department of Zoology sculptor, and plant models by Emil Sella, Curator of Exhibits in the Department of Botany. Keys to the models in the groups are furnished by small paintings made by Miss Laura Sparks. Preparators Henry Horback and Henry U. Taylor also contributed their talents to preparation of the hall.

CONTROL OF EROSION BY NATURAL MEANS

By HUGH C. CUTLER
CURATOR OF ECONOMIC BOTANY

FLOODS IN KANSAS and forest fires in New Mexico recently cost millions of dollars in property losses and destroyed large areas of land, yet they are the forerunners of even greater disasters unless a carefully considered land policy is adopted. Though the catastrophes differ, they are the result of the same mistake, mismanagement of the land through ignorance or greed.

The 1951 Southwest Botanical Expedition had an excellent opportunity to see the effect of short-sighted land-use policies. In Iowa, Missouri, Kansas, and Nebraska heavy rains were washing the soil from between the rows of corn, wheat, soybeans, and sorghum even where the land was nearly level. On the plains of Kansas crop rows went straight across rolling hills and gullies, providing channels for silt-laden rivulets. Fields stretched to the margins of ephemeral streams where banks of naked earth tumbled into the floodwaters. We had to make several detours in Kansas because roads were washed out or covered with silt, bridges destroyed, and once because an earthen dam had broken.

A few days later we neared the Continental Divide. To the west the lands were dry. In some places there had been no useful rain for five months. At the Divide the drought had little effect because steep hills had discouraged cattle and lumbermen. The little streams running to the San Juan and

EXAMPLE OF EROSION TOLL

After lumbering and over-grazing, too little soil remains to support the fence posts, so they are braced and supported by rocks.

Colorado rivers were full of clear water seeping from soils shaded by trees and covered by grass.

But only a few miles over the Divide trees were being cut and the earth was bare from overgrazing. Small sawmills, each with a smoking pile of sawdust and waste, were operated by workers who lived nearby in rough board shacks. Skinny cattle foraged over the rough slopes and found so little grass that they tasted even the poisonous lupines and larkspurs. In some places so little soil was left, even on the level, that fences were held up by stones.

High prices for lumber and meat have induced operators to cut as much timber as possible and to stock their range with all the cattle they can obtain. Most of these operators seek quick profits and many of them work on leased lands or mining grants unused for mining since the first claims were established. Some of the most overgrazed lands belong to the government.

Stock raising was a large and powerful industry in the Colorado River Basin by 1870. Individuals and companies grazed almost without restrictions. They fenced as much land as they could and often claimed in court that a man had a right to do this. The courts ruled that such fences were illegal but often granted title to lands taken in this fashion. About 1905 the National Forests were created and grazing in these was placed on a permit and fee basis. The public lands still open to grazing were then used as hard as possible. Each grazier ran as many cattle on the public lands as he could, for if he did not do this, some other herd took all the forage. The public range became seriously overgrazed and with the destruction of the edible grasses and forage plants, cactus, sage, juniper and other unpalatable plants dominated the range. In periods of drought thousands of cattle died. Dry years, with dust storms and the depletion of the range grasses, brought the Taylor Grazing Act of 1934. This provided for a distribution of grazing permits to established users of the range at a small fee, for improvement of the range, and for administrative management of public range lands. This is now done under the Bureau of Land Management of the Department of the Interior.

HOW PLANTS HELP

Where do plants come into the picture? What has botany to do with floods and the effect of drought? As far back as we have records we know that there have been years with heavy rains and others of drought. But heavy rains will penetrate and stay in soils made porous by roots and cannot wash fertile soil away if each droplet is scattered by blades of grass or each rivulet dammed and halted by interwoven sod. In dry years the moisture stored in the reservoir of humus under the shade of trees and the sod is slowly given up to water the plants and to feed springs and streams. Measurements on adjoining areas of land showed that 399 times as much water ran off a corn field as did off soil covered with a good sod, and that the farmed soil lost 4,250 times as much good dirt as the grass-covered piece. The grass-covered soil stored most of the rain and gave it off over a long period of time while rain falling on bare soil between corn rows rushed to the streams and rivers carrying a flood of silt.

Every serious flood or drought is followed by proposals to construct dams for flood control or for irrigation. Many of these are advocated by conscientious people, but a great many of these projects are designed to benefit a small region, to provide employment, gain power, or political advantage for a small group. Lately even the Army Engineers and the Bureau of Reclamation have entered the struggle to build more dams, each group seeking to erect more and bigger dams. Practically all of the proposals are shortsighted and try to treat the symptoms of our most serious national defects, not to remedy the basic causes. Many of the dams now built are nearly useless because their basins are filled with silt. Others are in danger of being ruined and proposals are made to build even more dams to trap sediment before it can reach dams further downstream. It is estimated that 129-million tons of silt reach Lake Mead each year, yet very little is being done to eliminate this silt at its source.

RESISTANCE WAVERS

The government has the power to save the nation's heritage of public lands and

(Continued on page 8, column 1)

MUSEUM MOVIE SPECIALIST IN U. S. SERVICE

John W. Moyer, Chief of the Museum's Division of Motion Pictures, departed August 15 on an extended leave of absence to accept an appointment for a special project in the information and educational fields of the U. S. Department of State's foreign service. His first assignment is to be in the Far East.

JOHN W. MOYER

Mr. Moyer has been associated with the Museum for twenty-two years. Before the war he was Taxidermist in the Division of Birds. In 1942 he joined the U. S. Navy as Chief Specialist in the medical research section of the Bureau of Medicine and Surgery, in which he engaged in the making of motion pictures. Upon his release from the Navy in 1946 he returned to the Museum to head the newly formed Division of Motion Pictures, in which his chief task was the making of a film on Museum activities entitled "Through These Doors," now in circulation before audiences of educational and other organizations.

DEEP SEA EXPEDITION

Loren P. Woods, Curator of Fishes, who reported in the August BULLETIN on the activities of the *Oregon*, scientific trawling vessel of the United States Fish and Wildlife Service, is again at sea on that ship. The *Oregon* left its home port of Pascagoula, Mississippi, August 13, with Mr. Woods aboard.

A series of four drags at 10, 20, 30 and 40 fathoms is to be made off the mouth of the Mississippi River, after which the ship will proceed to the vicinity of the Yucatan shrimping grounds in the Gulf of Campeche. There trawling will be carried on from Cayo Arenas to Cayo Arcos in 60 fathoms of water. A series of deep-water drags will be made also on the shelf at the edge of the Yucatan Channel.

As on his past voyages on the *Oregon*, it is expected that Curator Woods will be enabled to obtain important collections of fishes for the Museum.

CONTROL OF EROSION—

(*Continued from page 7*)

its investment in dams like Hoover Dam. Seventy per cent of the Colorado River Basin is in federal ownership despite large grants of railroad lands and the homesteading of many sites. The federal lands are the source of the greater part of the silt in the river; they are the most overgrazed. Although the Bureau of Land Management has power to restrict grazing, it does not do this vigorously because grazing interests, though they represent only a few people, are strong. The boards which issue grazing permits are often composed of ranchers who depend upon grazing permits and thus must be liberal in their allotments. Even officials on the Navajo Indian Reservation were forced to modify their plans to reduce a tremendous overload of stock because of severe protests from Indians and traders. Yet the Navajo Reservation, contributing only 2.5 per cent of the water to Lake Mead and comprising only 14 per cent of the basin, pours 22 per cent of the sediment into that reservoir. One of the few streams on the reservation, Chinle Creek, often carries more than 47 per cent of sediment by volume. In the accounts of early travelers the Chinle is described as a small, clear and permanent brook surrounded by grassy meadows. Now it is a temporary stream, deeply entrenched in silt and sand gullies.

Some opponents of grazing regulations say there have always been dry and wet periods and that regulation of land use will not help the present period. There is convincing evidence that it will. In 1908 the lands above Silver City, New Mexico, had been lumbered and grazed so that a creek flowing through the main street became a gully 15 to 40 feet deep, from 75 to 200 feet wide, and a mile long. Wells failed and the water supply dwindled. Wood cutting and grazing were restricted and check dams built in gullies. Now floods are checked, the gully is healing, and city wells which once could barely supply 75,000 gallons of water daily now yield 200,000.

WOULD AID RANCHING

Some ranchers claim that grazing regulation would raise the already high cost of meat. On the contrary, most controlled grazing results in more economical ranch operation. Each head of cattle needs sufficient food to grow efficiently. On some lands the forage is so scarce that nearly a square mile is required for each animal while on others only a few acres will provide enough food. If the grazing capacity of range land is exceeded, the animals spend most of their time and energy seeking food and grow slowly. Besides eating poisonous weeds when other forage is gone, they become weak and susceptible to disease. In a controlled experiment on severely eroded lands of the Navajo Reservation livestock numbers were reduced to the capacity of the forage, and land management practices were instituted. After the first three years the total weight of livestock produced was greater than ever before even though the number of animals was smaller. Erosion and flash floods were greatly reduced.

LAND MANAGEMENT NEEDED

The value of sensible land management practices must be taught before progress can be made with a land policy. The Museum library recently purchased *Ten Rivers in America's Future*, the report of the President's Water Resources Policy Commission. Throughout this report on the major rivers of the United States are recommendations that land must be managed effectively to prevent erosion and too rapid runoff of water. Yet the greatest amount of space is devoted to dam projects and very little of the unfavorable evidence against such projects is presented. This may represent the views of the commission, mainly people with an interest in building dams, but I believe dams are emphasized because they are tangible projects which can be presented to taxpayers as located in a definite spot and costing an estimated amount of money. Programs for watershed management must cover so many aspects that it is difficult to present them simply. Keeping the soil covered with plants, stopping flood and erosion at the source, and building up our ground water supplies are of primary importance, but they lack the spectacular appeal of huge dams with their falling water, miles of irrigation canals, and whir of hydroelectric generators. But unless we wake up and speed our efforts to preserve the plants which hold our soil, we will end up with silted dams and no fertile soil, a country of deserts like China, devastated alternately by flood and then by drought.

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the past month:

Department of Botany:

From: Dr. C. H. Muller, Santa Barbara, Calif.—82 oaks, Texas; Dr. E. E. Sherff, Chicago—77 Hawaiian phanerogams.

Department of Geology:

From: L. H. Bridwell, Forestburg, Tex.—Ceratodus tooth, Texas; George B. Hinton, Presidio, Texas—2 specimens of vanadanite crystals, Mexico.

Department of Zoology:

From: Eduardo F. Acosta y Lara, Montevideo, Uruguay—3 bats, Brazil and Uruguay; Chicago Zoological Society, Brookfield, Ill.—a cassowary skin; Dr. B. E. Dahlgren, Chicago—a bat, Camaguey, Cuba; John N. Dixon, Chicago—a collection of lower invertebrates, Tahiti; Dr. Alfred E. Emerson, Chicago—a paratype of a termite, Fort Dauphin, Madagascar; Capt. Bob Guillaudeu, San Francisco—4 frogs, 3 lizards, and a snake, Korea; Edward Brodie Henry, Leesville, S. C.—a snake, South Carolina; Harry Hoogstraal, Cairo, Egypt—a collection of lower invertebrates, Lower Egypt and Yemen, South Arabia; Paul Keller, Dyer, Ind.—a snake, Illinois; Dr. Boonsong Lekagul M.B., Bangkok, Siam—2 bats, Siam; Dr. S. A. Minton, Indianapolis—2 salamanders, 9 frogs, 4 snakes, and 2 lizards, Indiana; Philip W. Smith, Urbana, Ill.; a frog paratype, Illinois; Neal A. Weber, Swarthmore, Pa.—a snake and a lizard, Iraq.

Technical Publications

The following technical publications were issued recently by Chicago Natural History Museum:

Fieldiana: Zoology, Vol. 31, No. 45. *On the Clausiliidae of Palestine*. By Georg Haas. May 23, 1951. 24 pages. $0.40.

Fieldiana: Zoology, Vol. 31, No. 47. *Mammals from British Honduras, Mexico, Jamaica and Haiti*. By Philip Hershkovitz. July 10, 1951. 24 pages. $0.30.

Fieldiana: Zoology, Vol. 31, No. 48. *Birds of Negros Island*. By Austin L. Rand. July 12, 1951. 26 pages. $0.30.

Fieldiana: Zoology, Vol. 31, No. 49. *Review of the Subspecies of the Sunbird Nectarinia jugularis*. By Austin L. Rand. July 12, 1951. $0.20.

Fieldiana: Anthropology, Vol. 36, No. 6. *Acculturation and Material Culture—I*. By George I. Quimby and Alexander Spoehr. July 17, 1951. 42 pages. $1.

The two African elephants in the center of Stanley Field Hall were collected and mounted by the late Carl E. Akeley, noted explorer, naturalist, and sculptor, who was once a member of the Museum staff.

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BULLETIN
Vol.22,No.10-October 1951
Chicago Natural History Museum

Zoology
Hall 37
Introduction

NEW HALL OF PREHISTORIC LIFE

Preview for Members

Monday evening, October 1, 8 o'clock

(See page 3)

Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

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Members are requested to inform the Museum promptly of changes of address.

FOSSILS ARE FASCINATING WHEN SHOWN ATTRACTIVELY

Gems and minerals commonly possess attractions of their own, but fossil invertebrates and plants probably because of their stone-like appearance and lack of coloration, manifest little appeal for the public at large. Museum visitors often go past the fossil exhibits, completely ignoring them or casting but a cursory glance at the cases. What has been the reason for this seeming indifference? Was it that we had failed to bring to light the message that could be read in a fossil? We believed we had, readily accepted the challenge that our failure had brought about, and thought of ways and means by which we could do justice to the fossils and restore them to their rightful place. It has not been easy, but we believe we have found a satisfactory solution. The new exhibits in Frederick J. V. Skiff Hall (Hall 37), detailed descriptions of which will be found on page 3 of this issue of the BULLETIN, may well be the answer to our problem.

We have not sacrificed scientific accuracy but we have found that pleasing and appealing exhibits are not incompatible with it. We have further learned that a few carefully selected specimens can tell a story more eloquently and with greater clarity than a crowded assemblage of many. We have permitted some latitude and indulgence when confronted with specimens that are otherwise unattractive except to the charmed, often bewhiskered and bespectacled, circle of paleontologists, but even then we have never lost sight of the importance of the subject matter.

We feel that the new exhibits will dispel much of the indifference heretofore manifested in fossils, and that they will lead to a greater interest in, and a more appreciative use of them. To bring out in bold relief the fact that fossils are not just masses of disinterred stony remains of the past, but are documentary evidence of vanished oceans and forests, of the life that has appeared and disappeared, and of the vastness of history before the dawn of man, has been our main purpose. By this, we do not imply that the new exhibits are the last word in interpreting the message fossils bring to us. The story set forth in the hall of today will remain only until it appears that it no longer serves its purpose.

SHARAT KUMAR ROY
Chief Curator of Geology

STAFF NOTES

Miss Harriet Smith, of the Museum's Raymond Foundation lecture staff, is on leave of absence until February 15, to make a lecture tour in schools throughout the Middle West under the auspices of The School Assembly Service. Her lecture, entitled "Treasure House," accompanied by the Museum's color film "Through These Doors," will carry the message of this institution to thousands of children and teachers in many states .... **Dr. Sharat K. Roy,** Chief Curator of Geology, has returned from his expedition of several months to El Salvador. On his way back, he stopped in Mexico to make preliminary studies of the volcano Paricutin .... **Henry S. Dybas,** Associate Curator of Insects, recently joined Dr. Eliot Williams of the faculty of Wabash College, Crawfordsville, Indiana, on an insect-collecting trip in caves of southern Indiana. They were accompanied by Rodger Mitchell, Harry Nelson and Eugene Ray, who were temporarily employed in the Museum's Division of Insects during the summer .... **George I. Quimby,** Curator of Exhibits in Anthropology, has been appointed representative of the Society for American Archaeology in connection with the annual meetings of the American Anthropological Association to be held in Chicago in November .... **Donald Collier,** Curator of South American Ethnology and Archaeology, has been appointed chairman of the nominating committee for the Society for American Archaeology .... **Dr. Robert H. Denison,** Curator of Fossil Fishes, has returned from a successful collecting trip to various areas in the eastern United States. .... **Dr. Rainer Zangerl,** Curator of Fossil Reptiles, **Eugene S. Richardson, Jr.,** Curator of Fossil Invertebrates, and Curator Denison spent several days last month in paleontological reconnaissance work near Mecca, Illinois.

THIS MONTH'S COVER

Our cover shows a restoration of eurypterids, extinct crustacean-like creatures that lived about 350 million years ago. This is one of the new groups in Frederick J. V. Skiff Hall (Hall 37). The hall, completely reorganized and new, is to be reopened October 1 with a preview at 8 p.m. for Members of the Museum. Unlike mounted animals in Zoology or the plants reproduced in Botany, restorations illustrating geologic history are the product of "scientific detective work." It is not possible to mount a freshly-killed eurypterid, as a taxidermist would mount a tiger, nor can the artist work with a specimen or accurate illustration, as in the plant reproduction laboratory. Instead, a paleontologist, studying fragmentary fossil specimens of extinct plants and animals must gulde a sculptor in making what is literally a re-creation. The restorations in Hall 37 were made by sculptor George Marchand under the direction of Dr. Irving G. Reimann, of the University of Michigan.

NEW MEMBERS

The following persons became Museum Members from August 16 to September 7:

Associate Members

Miss Eva Josephine Jolly, Colonel Edward N. Wentworth.

Annual Members

Charles W. Allen, Sidney M. Boss, Terry Caselli, Valentine H. Christmann, Lyle B. Cline, Gordon R. Close, Hugh S. Cloud, Kenneth C. Eade, Arthur A. Ehrlich, James P. Ferrall, John A. Ferry, Mrs. Frank Fink, Walter J. Goettsch, Dr. Bernard A. Kamm, Sam Laud, Harry F. Liebrock, F. B. Rowe, Edward Shafer, Harold A. Stahl, T. N. Stensland.

Exhibit of Bird Paintings Continues Until Oct. 15

The special exhibit of "Song Birds of America," a series of twelve painting by the well-known artist, John Atherton, placed in Stanley Field Hall in September, will remain available to Museum visitors until October 15.

THREE BILLION YESTERYEARS RETRACED IN NEW EXHIBITS

By EUGENE S. RICHARDSON, Jr.
CURATOR OF FOSSIL INVERTEBRATES

Where are the snows of yesteryear?
François Villon

WE MAY LEAVE the asking of the question to the poets and its answering to the philosophers or the hydrologists. Those snows, at least, have now flowed over the dam. As we remember them, they were unpleasantly cold, and we're glad that they've gone on their way.

But where are the snows of a few hundred years ago? What part of the world was covered with ice a few thousand years ago? What living things ruled the world a few million years ago?

To such questions, if a modern Villon should ask them, we are prepared to give answers. In Frederick J. V. Skiff Hall (Hall 37), reopened formally for members of the Museum on October 1, the long panorama of the three billion years of earth history is set forth in a series of entirely new exhibits, emphasizing the last 540 million years, the time during which the earth has been inhabited.

The snows that fell in Wisconsin a few hundred years ago, we find, are now being pumped from deep wells beneath Chicago, as water for industrial use. A diagram shows that the water has slowly worked its way through beds of underground porous rock. The area of the great ice sheet of about 25,000 years ago is shown as a cold, icy-looking layer of plastic, covering part of a world map. Ancient animals and plants from the ages before history are there in abundance. Many are in the form of accurate life-sized models shown in natural surroundings, but more are shown as actual fossils, from Chicago's quarries, Illinois' coal fields, and hundreds of more distant places in the United States and elsewhere.

REEF DWELLERS

In a limestone deposited on a reef in the Permian period, 200 million years ago in western Texas, the fossil shells have been replaced by hard, insoluble silica. The models in this new habitat group in Hall 37 were cast from specimens obtained by dissolving the limestone. Sponges and brachiopods are the most abundant of the various animals shown.

The exhibits, occupying 53 new cases, are arranged in two sequences. On the south side of the hall they constitute a summary of life in the world through the twelve geologic periods, a historical sequence. In the cases on the north side, the fossils are arranged by natural groups, forming a biological sequence.

Entering the hall from the east, from the gallery overlooking Stanley Field Hall, the visitor sees first a group of four cases flanking the door. These contain introductory exhibits. People who collect their own fossils will turn to the right, where a map shows the distribution of bedrock of various ages in the Chicago area, with examples of fossils found within 50 miles of the Loop. To the left of the door another case shows what fossils are—and also a collection of objects that look like fossils but are really something else. This information should be helpful to collectors who treasure rounded stones or concretions in the belief that they have found petrified slugs, tomatoes, squirrels, or other non-petrifiable items. Flesh preserved from prehistoric times is extremely rare, though examples of a frozen mammoth, a pickled rhinoceros, and a dried sloth are illustrated by drawings in this exhibit.

Another introductory case shows the influence of mutation and selection on evolution. This intricate subject is helped along by specimens chosen to show fossil types that have died out, others that have persisted for long ages, and others that followed evolutionary blind alleys. By means of models arranged on a diagrammatic background, the last introductory exhibit shows the relationship of all groups of animals and plants.

On the north side of the hall, the natural groups of animals and plants are arranged in systematic sequence. Walking along from the east end, we see first the protozoans and sponges, and then a case showing how foraminifera, tiny fossil protozoans, are important in oil-well drilling. Fossil foraminifera from several levels of a typical oil well are shown as enlarged models. Since each rock formation contains characteristic fossils, oil geologists are able to determine the oil-bearing bed and to guide the drills probing

MEMBERS ARE INVITED TO EVENING PREVIEW OF NEW HALL

(Monday, October 1, 8 p.m.)

All Museum Members, and their families, are invited to a special preview formally reopening Frederick J. V. Skiff Hall (Hall 37), at 8 o'clock on the evening of Monday, October 1 (the doors of the building will be opened at 7:30 p.m.). The hall contains a comprehensive, completely new series of exhibits illustrating fossil plant and invertebrate animal life and evolution over hundreds of millions of years. Outstanding feature is a series of ten habitat groups restoring the weird creatures of eons ago, made by the noted sculptor, George Marchand.

In addition, at 8:15 p.m. in the James Simpson Theatre, Members may view the color motion picture "Through These Doors." This film tells the story of the Museum and its exhibits from expeditions collecting in the field all over the world, though the research laboratories and preparators' studios to the completed exhibits.

The offices, workrooms and study collections will also be available for inspection.

A GARDEN OF PREHISTORIC SEA LILIES

Sea lilies, or crinoids, are actually colorful, flower-shaped animals. In the oceans of today they live in groups resembling garden plants. Fossils in the Museum's collection show that crinoid gardens were also common in the past, particularly 300 million years ago, in the Mississippian period, the time of this new habitat group in Frederick J. V. Skiff Hall (Hall 37).

FISHES UNKNOWN TO ANGLERS

Where, 50 million years ago, was a large lake well-stocked with many kinds of fishes, there now are the dry and sun-baked mesas of southwestern Wyoming. The lake deposits yield abundant fossils of those early fishes, which have become the principal article of trade of the small town of Fossil, some of whose ancient inhabitants are restored in this new habitat group in Hall 37.

for oil thousands of feet beneath the surface. Continuing the biological series are cases showing fossil coelenterates (corals and allies), brachiopods, worms, clams, snails, cephalopods, echinoderms (sea-lilies, sand-dollars, and allies) and arthropods (insects, crustaceans, and allies), to complete the roster of invertebrates, or animals without backbones. The vertebrate groups are displayed, as always, in adjoining Ernest R. Graham Hall (Hall 38). The remaining cases on the north side of the hall are devoted to the groups of plants that have left a significant fossil record, beginning with a case showing the relation of fossil plants to coal, and ending with a "family tree" illustrating the relationship and classification of plants.

On the south side of the hall, the geological periods are the subject of the cases. Fossils of different natural orders are associated here by periods because it is the study of the succession of kinds of fossils that enables us to determine the relative ages of beds of rock and thus to decipher geological history. But other things besides fossils are needed to exhibit the record of the earth's yesteryears. To find where ancient seas existed, geologists map sedimentary rocks—the hardened sands and muds of vanished ocean bottoms—determining their relative ages by matching the fossils entombed in them. There is much more dry land area today than has been usual in the past. Three comparative maps for each period show the changes in North American terrain as the sea covered now one part, now another.

The earth's crust preserved other records besides fossils, the record of life, and sedimentary rocks, the record of seas. Granites, ores, and crumpled rocks tell of ancient mountain ranges now worn away; beds of ash tell of volcanoes that left no other trace; coal beds mean former forests. Evidence of all kinds has been brought together in these exhibits to make a concise outline of the geography, economic resources, and life of each of the geologic periods.

Each geologic period is represented by a group of cases—usually one being a habitat group showing restored animals of the period, another a display of the geographic and economic features, and another showing typical fossils. The Silurian period has been given greater prominence than the others. This is for the reason that the bedrock of the Chicago area is of Silurian age, There are two Silurian habitat groups: the eurypterids (*see cover*), included because they are spectacular and characteristic, and a

SATURDAY AFTERNOON LECTURES OPEN OCTOBER 6

The annual autumn course of free illustrated lectures on travel and science for adults will begin at the Museum on October 6 and continue each Saturday throughout October and November. The lectures will be given in the James Simpson Theatre of the Museum and all will begin at 2:30 P.M. Seven of the lectures will be illustrated with color movies and one with slides.

Limited accommodations make it necessary to restrict these lectures to adults. Members of the Museum are entitled to reserved seats on application. For children, free motion pictures will be presented on the mornings of the same Saturdays by the Raymond Foundation.

Following are the dates, subjects, and lecturers:

October 6—VIRGINIA
A fresh look at the Old Dominion state
Edward F. Cross

October 13—TAHITI
Volcanic island of romantic beauty and grandeur
Earl B. Brink

October 20—DID A COMET BLAST ARIZONA?
The mystery of Canyon Diablo crater (Illustrated with slides)
H. H. Nininger

October 27—THE GREAT UNGAVA CRATER
1950 geological expedition to northernmost Quebec
V. B. Meen

November 3—EARTHQUAKE LAKE
Reelfoot Lake, fascinating wilderness in Tennessee
Karl Maslowski

November 10—SHANGRI-LA ALASKA
Pioneering on our last frontier
Fred Machetanz

November 17—EXPLORATION IN NEPAL
Difficult journey to the high Himalayan kingdom
S. Dillon Ripley

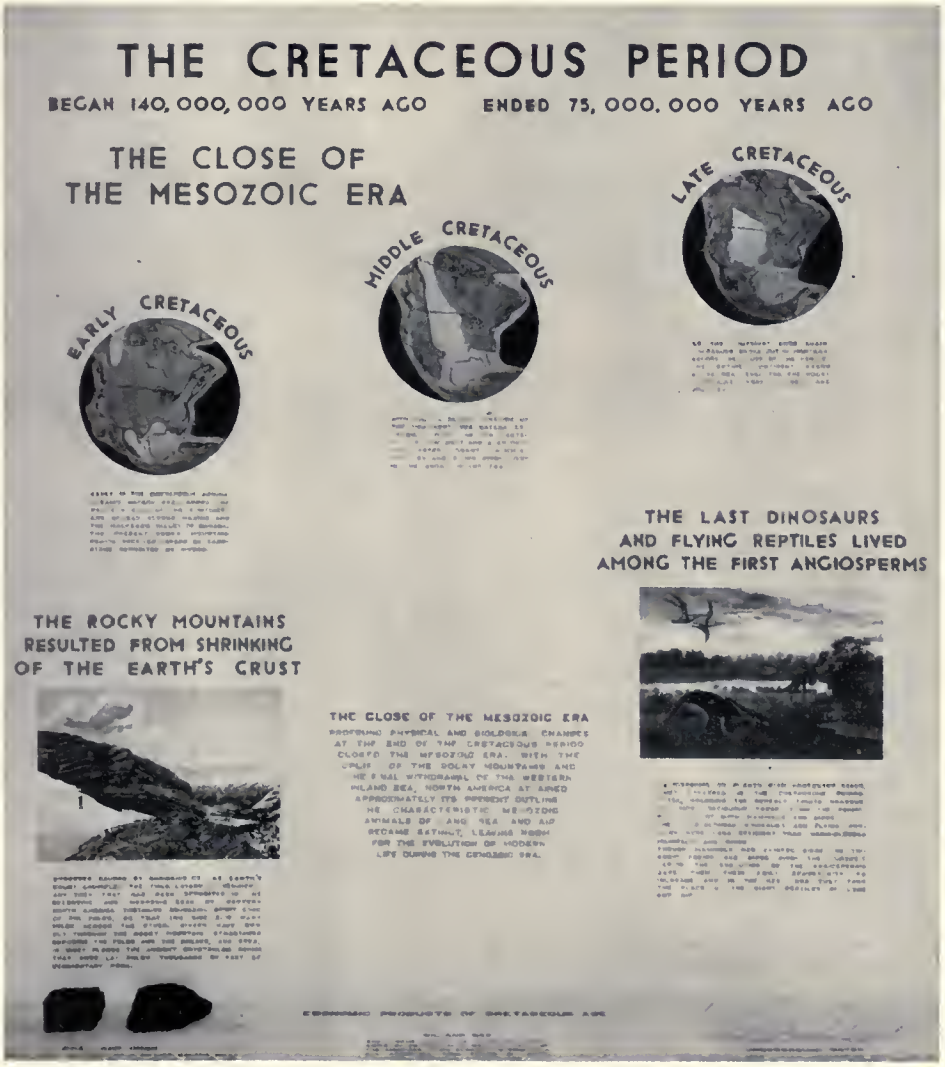
November 24—ALGERIA
Sahara sand and oasis
Clifford J. Kamen

No tickets are necessary for admission to these lectures. A section of the Theatre is reserved for Members of the Museum, each of whom is entitled to two reserved seats. Requests for these seats should be made in advance by telephone (WAbash 2-9410) or in writing, and seats will be held in the Member's name until 2:25 o'clock on the lecture day.

reef representing Silurian sea life on the site of Chicago. Besides these, there are two cases of Silurian fossils, one collection coming entirely from quarries and excavations in the vicinity of this city.

The highlight of the historical sequence of exhibits is the series of ten habitat groups by George Marchand, well-known sculptor of Ebenezer, New York. Colorful models of prehistoric plants and animals are arranged in groups in lifelike positions amid natural-looking surroundings. Not all prehistoric animals are well enough known from their fossils to permit their reconstruction for such a group. The restorations of soft-bodied animals cause the greatest trouble, in general, for when they are fossilized at all it is likely to be in the form of a flattened film. Nevertheless, several soft-bodied animals may be seen in the Cambrian group. It was possible to make these with some degree of assurance because a great many specimens are known showing the animal crushed in enough different positions to reveal its anatomy. In the foreground of the Devonian habitat group is a large spiny trilobite, *Terataspis*. Though it bore a shell, no complete specimens have been discovered. The first fragments of a fossil of this trilobite were collected about a hundred years ago, and others have been turning up ever since. The first reconstruction was made in 1892 by Dr. John M. Clarke, of the New York State Museum. Then, after examining the fragments that had been collected during the next fifty years, Dr. Irving G. Reimann, of the Buffalo Museum of Science, made an improved restoration in 1941. Soon after that, Dr. Reimann found a fine large fragment showing more details, and made another reconstruction in 1944. The model in our group was made under his direction.

Hall 37 is now before the public. The fossil plants and invertebrates in their new surroundings will serve for many years to tell the story of the millions of yesteryears since life took its place on our planet.


THE CRETACEOUS PERIOD
BEGAN 140,000,000 YEARS AGO
ENDED 75,000,000 YEARS AGO
THE CLOSE OF THE MESOZOIC ERA
EARLY CRETACEOUS
MIDDLE CRETACEOUS
LATE CRETACEOUS
THE LAST DINOSAURS AND FLYING REPTILES LIVED AMONG THE FIRST ANGIOSPERMS
THE ROCKY MOUNTAINS RESULTED FROM SHRINKING OF THE EARTH'S CRUST
THE CLOSE OF THE MESOZOIC ERA

HISTORY OF THE CRETACEOUS PERIOD

There is more to geologic history than the succession of fossils shown in the habitat groups in our new hall. Cases such as this one show the changes in North American geography as the oceans moved back and forth across the continent. Paintings by John Conrad Hansen, Department of Geology Artist, illustrate physical forces and large animals that cannot be included in the other cases.

'TALKING DUST' TELLS STORY OF INDIANS

By TOM ALDER
MEMBER, SOUTHWEST ARCHAEOLOGICAL EXPEDITION STAFF

AT ABOUT THE TIME that Rome burned (circa A.D. 60) another, much smaller, fire routed a group of Mogollon Indians from their cave home in western New Mexico. For centuries, the forefathers of these people had occupied this cave and these people continued the tradition. There were good reasons for their having done so. The cave was large (60 feet long, 12 feet high and 10 feet wide), cool in summer and warm in winter. It was comfortable; but what was more important, it was in an excellent defensive position to ward off attacks by hostile neighbors.

The cave, now being excavated by the Museum's Archaeological Expedition to the Southwest, is situated 1,200 feet above and one and one-half miles from the valley floor. This protection was important, but it came at a price. To get their water, these early cave dwellers had to travel over rugged slopes on foot to the river in the valley. They had to go the same distance to reach the rich land in which they cultivated corn. This meant that the women probably had full responsibility for keeping the household and preparing the meals for their menfolk who almost certainly spent the day away from the cave farming and hunting.

The women made baskets and wove matting for bedding. They brought in yucca leaves and corn stalks to keep down the dust from the cave floor and to make softer walking. They also made the pottery, an art that they had recently acquired from southern neighbors and had the meals ready for the men when they returned from the fields.

A SPARK, THEN CATASTROPHE

Perhaps, while the women were preparing a meal a spark flew from the fire and ignited some of the fibrous materials that lay strewn about. In a matter of moments, the flames and smoke became so fierce the cave had to be abandoned. The women and children fled to safety. There was no way of quelling the flames, even if one could have gotten near the fiery furnace, because the water supply was so distant. The only thing to do was to let the fire burn itself out. This must have taken several weeks because of the fact the floor was deeply impregnated with fibers and grasses from generations past.

The fire smoldered beneath the surface making reoccupation impossible for some time. It is probable the Mogollon Indians attached a religious significance to the fire.

(*Continued on page 7, column 2*)

MORE ABOUT NEW HALL OF EARTH HISTORY . . .

EXTINCT PLANTS AND THEIR LIVING DESCENDANTS

By THEODOR JUST
CHIEF CURATOR, DEPARTMENT OF BOTANY

LIFE ON THIS PLANET has a long and intricate history. Although its beginning is shrouded in mystery, we know enough about living plants to think of their ancestors as primitive organisms capable of performing some of the most important functions generally regarded as evidence of life. These primitive organisms were certainly aquatic, microscopic in size, able to make their own organic food materials, and capable of reproduction. Being soft-bodied, few of these, if any, left discernible geological traces. Yet their descendants, empowered with greater structural complexity and functional diversity, contributed materially to rock building and the formation of soil, so necessary for the growth of land plants.

The geological story of land plants, as far as it is known today, begins late in the Silurian period. The main phases of this development are shown in the eight new cases situated on the south side of the reorganized Frederick J. V. Skiff Hall (Hall 37) near Ernest R. Graham Hall (Hall 38). The first case near that door to the hall reopening October 1 contains a visual scheme of classification of the plant kingdom. Each main group is represented by a characteristic member, either living or fossil, and the relationships among the various groups are indicated by connecting lines. Several of the main groups shown in the lower part of the scheme are commonly called "algae." Their members are mainly aquatic, capable of making their own organic food materials and characteristically colored. The other groups shown in this part of the exhibit are incapable of making their own organic food materials and depend on other organisms for such, either by living at the expense of their hosts or by breaking down dead plant and animal bodies. These groups are represented by the "fungi" and by some bacteria. Although many of these organisms are aquatic, the majority lives on land.

One of the groups of algae, the green algae, is believed to have given rise to the vascular plants. Since the beginning of the Devonian period land plants have become increasingly more important, while growing in stature from small grass-like plants to the large scale-trees of the Pennsylvanian period and the modern giants, such as the American redwood and big tree and the Australian eucalypts. This general increase in size and complexity of structure is roughly reflected in the geological sequence of appearance of the great groups of vascular plants and their present day representation in numbers of species and individuals. The small exhibit case at the end of the first alcove illustrates this general advance in a diagrammatic manner. The other large cases depict, group by group, characteristic members as found in fossil state, often accompanied by reconstructions made up of many isolated parts discovered at various times by many collectors in different localities.

Unlike their living descendants, fossil land plants are always found in parts, either as stumps with some large roots attached, stems, branches, leaves, or organs of reproduction. Rarely are some of these attached one to another. At best some may be found associated in the same bed. As these parts become known and are given names, the whole plant can ultimately be pieced together. Such a reconstruction aims to show the general habit and mode of growth of the original plant. Comparatively few fossil plants are well enough known to permit their reconstruction as a whole.

SYNOPTIC CLASSIFICATION OF THE PLANT KINGDOM

The Plant Kingdom, with several hundred thousand species, is divided into a number of main groups. The possible relationships of these groups are shown by connecting lines. The models are made natural size or enlarged for purposes of exhibition. Actual specimens are shown as far as possible.

TRACING THE PAST

Comparison of the internal structure of fossil plants with that of their closest living relatives and analysis of the rocks containing these fossils permit conclusions regarding past climates and conditions of fossilization. A particularly instructive example of this kind is provided by coal. The principal kinds of coal and the processes effecting its formation are illustrated in the small cases at the end of the second alcove. Actually coal represents the geological record of swamp vegetation growing in a moist, non-seasonal, warm, but not tropical climate.

But not all fossil plants known come from coals. Many are found in other deposits in various states of preservation. Some are so well preserved that they can hardly be told apart from their living descendants. Others, no longer present in our floras, are known only from one or several specimens. Still others are known from many parts of the world thus providing the geologist with valuable means for comparing similar strata in widely separated localities.

NATURE PHOTO CONTEST ENTRIES OPEN

The Nature Camera Club of Chicago and Chicago Natural History Museum are ready to receive entries for the Seventh Chicago International Exhibition of Nature Photography to be held at the Museum February 1 to 28 inclusive. All persons interested in nature photography—both amateur and professional photographers—are invited to send their best nature pictures for entry in this contest. Deadline for entries is January 14.

Silver medals and ribbons will be awarded in the various print and slide classifications. Entry forms and a complete resumé of conditions of the contest may be obtained from the Museum. Entries should be sent to the Museum.

Illinois Audubon Lectures Coming to Museum

The Illinois Audubon Society will again present its autumn series of free lectures in the James Simpson Theatre of this institution. The first will be presented on Sunday afternoon, November 18, at 2:30, when Fran W. Hall will give a lecture entitled "The Four Corners," accompanied by motion pictures in color. The general public is invited, and Museum members are entitled to seats in the reserved section of the theatre.

Books

(All books reviewed in the BULLETIN *are available in The Book Shop of the Museum. Mail orders accompanied by remittance including postage are promptly filled.)*

A TEXTBOOK OF GEOLOGY. By Robert M. Garrels. Harper, 1951. xvii+ 511 pp., 301 illustrations. Price $5.

Although there is no royal road to geology, Professor Garrels has provided what seems to be a superhighway. In a book designed for a one-semester college course, he has selected just the kind of information needed by the person who wants to find out about geology for himself.

One who stands on a hill and sees that the land before him was cut down to its present level by the running water of a stream, or one who stands on a beach and sees that the cliff behind him was cut by the waves is deducing geologic history from the evidence at hand. The history of the earth, then, may be said to be the object of his observations. It is also the object of Professor Garrels' book, and the reader is led to that object from a consideration of the processes continually operating to change the face of nature.

Starting with a discussion of the energy of running water, the author shows how the Colorado River carved the Grand Canyon. The necessary physics is gently and completely presented before a conclusion is reached. By the time we have read the 54 pages on running water, we find ourselves deducing the history of other streams and valleys on our own.

The work of waves, wind, ice, and underground water are presented in the same way, followed by chapters on the origin and composition of the sedimentary, igneous, and metamorphic rocks. In each, the fundamental physical or chemical information is given first, usually with the aid of graphs. Graphs are an innovation in an elementary geology text, and a welcome one. A graph replaces many times its area of printed text, and puts the information in the most available form. Conclusions regarding geologic processes follow the graphs with a logical inevitability that makes them immediately the personal property of the reader.

With these chapters under his hat, the novice can now go forth and admire valleys, beaches, dunes, and other land forms with a new understanding. But we are only half way through the book. The chapter, "Evidence of Earth Movement," follows. Instead of being told that the earth has risen and fallen and broken locally, we are shown why we must conclude that it has. Studying geology this way, we don't have to remember a great body of facts; we are now able to see them for ourselves.

Now that we are familiar with present-day activities of the earth's crust, we are treated to 34 pages of deductions that unravel a good sample of geologic history, and 16 pages in which we discover that we can find out quite a bit about the earth's inaccessible interior. Then follow three chapters during which the reader will not want to lay the book aside: "True-scale Models," "Mechanics of Earth Movement," and "The Origin of the Earth."

A chapter on modern life, followed by one on fossilization and a survey of geologic history prepare us for the final chapters on evolution. Those interested enough in this Museum's new Hall of Invertebrate Paleontology *(see page 3)* to desire further study of the subject will find this book of value. Thus, in 468 pages (not counting the appendices), we have learned a fair amount of physics, chemistry, and biology, and have deduced from them enough of geologic history to go on making further deductions on our own.

It is of interest to the readers of the BULLETIN that a part of the chapter on the work of waves is taken from a recent outstanding paper on refraction of ocean waves, of which Melvin A. Traylor, Jr., Research Associate in Birds on the Museum staff, is co-author. Also, it is gratifying to find that 44 of the excellent illustrations are photographs of exhibits or study specimens from this Museum.

EUGENE S. RICHARDSON, JR.
Curator of Fossil Invertebrates

'TALKING DUST'—

(Continued from page 5)

They may have believed it was an ill omen, a punishment for their evil deeds or for not properly propitiating their gods. At any rate, and for whatever reason, they ceased to live in the cave, for we find no evidence of extended or continuous occupation of the cave from about the first century after Christ until the coming of the Apache Indians (about 1700).

HOW DO WE KNOW?

This all took place almost 2,000 years ago but there is no written record of the event. How, then, do we know it took place? On what can we base these assumptions? The answer is "talking dust"!

We have, by the science of archaeology, made the dusty floors of the cave tell us of the ways and lives of the people who have walked upon it. In excavating this site, that we call Cordova Cave, we have found an ash layer, 6 to 14 inches thick and lying several feet below the surface, extending from wall to wall, and from front to back. This is a positive sign of a holocaust, for no fire-pit would be so large. The depth of the ash layer indicates that the fire was of some duration and the calcined condition of the stone implements in the layer attests to the intensity of the blaze.

The so-called "durable items" such as arrowheads, pottery, knives and scrapers of stone, give us the necessary clue for dating the occurrence of the fire—and we have therefore been able to estimate that it took place between the years 150 B.C. and A.D. 200. We can safely assume that the occupants of the cave covered the floor of this cave with fibers, grasses, and matting, because previous excavations have shown this to have been a common practice.

We know they were farmers because of the corn-cobs and vegetal refuse left in the cave in charred forms. We know that the cave remained unoccupied until modern times because the pottery and tool types above the ash layer have European characteristics. The presence of particular tools and a cache of horse hides indicates that the Apaches used the cave in recent times.

TABOO AFTER FIRE?

To attribute the abandonment of the cave to a religious taboo is of course pure conjecture. The only evidence to support this guess is that this kind of event has caused other Indian groups to attach a religious interpretation to catastrophes. The Mogollon Indians continued to live in the area for many centuries after the fire and might have, if they had so chosen, reoccupied the cave.

During the great drought (about A.D. 1270), the Mogollon people left the area and the cave was next occupied from about 1700 to 1870 by Apaches.

In 1951, a group of archaeologists in a period of three months have sifted from the dusty cave floor a story of 3,000 years of a culture in the Southwest.

Not only was the fire a tragic event for the occupants of the cave; it was one for the archaeologists also! All perishable items—bows, arrows, spear-throwers, clothing, basketry, snares, leather—were destroyed for an important, early period.

Excavations are still in process, however, and it is possible that the deepest levels, dating from about 700 B.C. may yield much valuable information. These levels have not yet been reached.

PLEASE NOTIFY MUSEUM IF YOU'RE MOVING

Members of the Museum who change residence are urged to notify the Museum so that the BULLETIN and other communications may reach them promptly.

A card for this purpose is enclosed with this issue.

Members going away for extended periods may have Museum matter sent to their temporary addresses.

RESERVATIONS OPENING FOR LAYMAN LECTURES

"Out of This World—for One Afternoon" is the title of the opening lecture in the new season of Sunday afternoons at the Museum with the Layman Lecturer, Paul G. Dallwig. This subject will be presented each Sunday in November—the 4th, 11th, 18th and 25th. In this dramatized lecture Mr. Dallwig will take his audience into the strange world of millions of years ago with all its weird plant and animal life as represented in the new Hall of Fossil Invertebrates (Frederick J. V. Skiff Hall—Hall 37) opening October 1 (*see page 3*), and Ernest R. Graham Hall (Hall 38) of Fossil Vertebrates. The lecture will include five dramatic episodes in which the hearers will participate in two Museum expeditions, one that uncovers a huge dinosaur skeleton, and one to the Gobi Desert on which the first dinosaur eggs were discovered while seeking traces of ancient man. The other dramatizations include a trip to a 250-million-year-old forest of the coal age, the death struggle of prehistoric monsters trapped in the LaBrea tar pits of California, and a battle between two of the most terrifying dinosaurs of the ancient reptilian world.

On Sundays in December Mr. Dallwig's lecture will be "Gems, Jewels and 'Junk' "; in January, "Living Races and Their Way of Life"; March, "Money DOES Grow on Trees," and April, "Life—What Is it?

During February Mr. Dallwig will be on an out-of-town lecture tour and will not appear at the Museum.

Members of the Museum may use their membership cards to attend these lectures without advance reservations. All others, with the exception of accredited representatives of the press, must make advance reservations to attend the Sunday lectures. Reservations may be made beginning October 1 by mail or telephone (WAbash 2-9410). The lectures are free. They start promptly at 2 P.M. and end at 4:30 P.M., including a half-hour intermission for relaxation, or for lunch or a cup of tea or coffee in the Museum Cafeteria, where smoking is permitted.

CHILDREN'S FREE MOVIES ON SATURDAY MORNINGS

Seven free motion picture programs and one puppet show for children will be given at the Museum on Saturday mornings during October and November. The entertainments, to be presented each Saturday at 10:30 A.M. beginning October 6, will be given in the James Simpson Theatre, under the auspices of the James Nelson and Anna Louise Raymond Foundation. The October 27 program will be a puppet production. On one program, that of November 10, the picture, "Shangri-la Alaska," will be accompanied by a talk by Fred Machetanz of Kenton, Ohio, the explorer who made the film.

Children may come alone, accompanied by parents or other adults, or in groups from schools, etc. No tickets are needed.

Following are titles and dates of the programs:

October 6—WONDERLAND TALES
Stories about animals, boys and girls
Also a cartoon

October 13—SAVAGE SPLENDOR
A picture hunting expedition in Africa meets native tribesmen and has exciting adventures with lions, rhinos and many other animals

October 20—CHINA
A film story of the largest branch of the human family on earth
Also a cartoon

October 27—FOLKTALE PUPPET STUDIO
Presenting "Aesop's Fables" and "Color Fantasies"

November 3—AUSTRALIA'S BARRIER REEF
The fabulous coral growths and the underwater life shown under magnification
Also a cartoon

November 10—SHANGRI-LA ALASKA
Pioneering on the last frontier. Color motion picture and story by Fred Machetanz

November 17—PACIFIC ISLANDS
Life in Hawaii, Bali and Tagaqe
Also a cartoon

November 24—ANIMAL LEGENDS
Also a cartoon

LECTURE TOURS IN OCTOBER DAILY EXCEPT SUNDAY

Tours of exhibits, under the guidance of staff lecturers, are conducted every afternoon at 2 o'clock, except Sundays and certain holidays. On Mondays, Tuesdays, Thursdays and Saturdays, general tours are given covering all departments. Special subjects are offered on Wednesdays and Fridays. A schedule of these follows:

Wed., Oct. 3—Poisonous Plants and Animals (*Marie Svoboda*).

Frl., Oct. 5—Color in Nature. Illustrated introduction in Meeting Room (*Jane Sharpe*).

Wed., Oct. 10—The Races of Mankind (*Miriam Wood*).

Fri., Oct. 12—Animals of Legend and Fable. Illustrated introduction in Meeting Room (*Lorain Stephens*).

Wed., Oct. 17—Life in the Water (*Jane Sharpe*).

Fri., Oct. 19—The Dynamic Earth. Illustrated introduction in Meeting Room (*Anne Stromquist*).

Wed., Oct. 24—Web of Life—Interdependence of Plants and Animals (*Marie Svoboda*).

Fri., Oct. 26—Masks—Not for Halloween. Illustrated introduction in Meeting Room (*June Buchwald*).

Wed., Oct. 31—Giants in the Animal World (*Lorain Stephens*).

FIFTY YEARS AGO AT THE MUSEUM

Compiled by MARGARET J. BAUER

From the Annual Report of the Director for 1901:

"*Attendance.*—A falling off in the total attendance for the year has to be reported. The figures show a difference of 18,491 in favor of the year ending September 30, 1900, over the year ending September 30, 1901. More than half of this decrease occurs in the month of September, 1901, when the attendance was 9,782 less than in the same month of the previous year. The only explanation of this large difference is in the fact that the weather was inclement on three out of the nine free days of the month. The marked decrease in the paid attendance is explained by the fact that during the previous year the visit of the G.A.R. to Chicago brought a great many strangers to the city, who visited the Museum in large numbers, in fact, the paid attendance during the week of the encampment was 4,500 more than the average. It is encouraging in view of this diminution to note that the attendance of scholars and teachers is the largest in the history of the Museum, being over 1,500 in excess of any previous year."

[The total attendance for 1901 was 244,120; that of 1950 was 1,173,661; for the first eight months of 1951 attendance totaled 928,029.]

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the past month:

Department of Botany:

From: Floyd Swink, Chicago—111 phanerogams, Indiana and Illinois; Llewellyn Williams, Randolph, Wis.—129 specimens of woods, Siam and Philippine Islands.

Department of Geology:

From: L. Z. Gray, Evanston, Ill.—Pleistocene mammoth tooth, Siberia.

Department of Zoology:

From: Neal A. Weber, Swarthmore, Pa.—8 frogs, 9 lizards, and a snake, Iraq.

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Chicago Natural History Museum

FOUNDED BY MARSHALL FIELD, 1893

Roosevelt Road and Lake Shore Drive, Chicago 5

TELEPHONE: WABASH 2-9410

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Members are requested to inform the Museum promptly of changes of address.

THE ERA OF RETHINKING IN MUSEUM EXHIBITION

A YOUNG MUSEUM of natural history, if it is to be a great one with the whole world as its field, must eagerly accumulate as much as it can, and the emphasis on collecting the material objects known as museum specimens will dominate the outlook of the staff. There is little time for thought, for whole halls cry to be filled, and in many fields of interest opportunities to collect specimens may never again be presented—witness the animals extinct within historic times, and the primitive human cultures transformed or even swallowed up by the spread of civilization. Rivalry with other museums, a combination of the acquisitive instinct with all too human pride and vanity, spurs on the acquisition of specimens and yet more specimens. All this produces an Era of Accumulation as an essential growth-stage of a museum.

During this era, there is a tendency to put everything available on exhibition, and museums can be found whose development was arrested at this stage. Fortunately for American museums, the principle of separation of specimens intended for study from those intended for exhibition was adopted at an early period of their history, and this separation reflects the dual function of museums and museum staffs, of research and publication on one hand, operating as a research institute, and on the other the preparation of exhibits on a magnificent scale as an educational program.

The end of the era of accumulation in the exhibition halls approaches when the halls and the cases in them are filled. The museum staff, if it be worthy of its extraordinary privilege of intimate contact with the "Three Kingdoms of Nature," with that of Man for good measure, must now take time out from collecting and from the eager preparation of exhibits and yet more exhibits to take thought about the meanings and functions, in the broadest sense, of a museum of natural history. We must turn from an era of accumulation to an *Era of Thought.*

It becomes immediately evident that we have grown without much thought or plan during the era of accumulation. The fine large habitat groups in the zoological halls are themselves a reaction from the rows of stuffed specimens in older museums. But a thoughtful survey shows that they represent what was available rather than what was most needed to fulfill a systematic plan of education. Even the irreducible minimum of a *conspectus of nature* has been only partly accomplished.

As we begin to think more deeply about what we want the visitor to learn from the Museum, our first discovery is that we have exhibited too much. There is no virtue in exhibiting endless rows of arrowheads or pots or even of closely similar shells or sparrows, except for specific purposes. The problem proves now to be to make the most intelligent selection from the older accumulations. Intelligent selection requires much thought, and we have all come to realize what hard work such thinking may be, with an occasional envious moment of recollection of the good old days when we merely mounted and installed what was available. It is much more difficult to select intelligently than it was to accumulate. Most important of all, selection gives us room in our cases for the illustrations and diagrams that are so much more effective as labels than the solid blocks of print that were in vogue thirty years ago.

The new Hall of Invertebrate Paleontology (Frederick J. V. Skiff Hall—Hall 37) is a visible expression of what I have attempted to set forth. The Museum is still only at the beginning of the vast job of rethinking its exhibition program; but important beginnings have been made in every department. The thoughtful visitor may be intrigued to contrast the new halls devoted to the North American Indians with some of the older exhibition halls, in which priceless materials are so crowded together that their intended effect is not accomplished. Perhaps he will understand something of the stimulating atmosphere in a museum that, far from being finished, has begun to grow in a new direction.

KARL P. SCHMIDT
Chief Curator of Zoology

THIS MONTH'S COVER

On our cover is a picture of another of the ten habitat groups of prehistoric animals exhibited in the new Hall of Invertebrate Paleontology (*read "An Ancient Sea," page 7, this issue*) **which was opened formally October 1. It represents the inhabitants of the waters that spread across central North America during the Ordovician period, about 390 million years ago. At least a dozen times since the world began, changes in the elevation of land and sea have caused the oceans to advance across the continents. In the muds and sands deposited in those oceans are fossils that constitute the record of the animals and plants that lived in the advancing waters. Even today, when the continents stand higher and drier than at most times in the past, parts of them lie below sea level and are covered by similar seas, such as Hudson Bay and the North Sea, and there the fossil record is accumulating for the future.**

MUSEUM MEMBERS' NIGHT PROVES GALA OCCASION

The Members' Night held at the Museum on October 1 was voted a complete success. Approximately 1,000 Members turned out to see the new Museum film, "Through These Doors," to preview the new Hall of Geologic History of Plants and Animals, and to visit the shops and workrooms on the third and fourth floors of the Museum.

Normally, it is not possible to open the workrooms, preparation rooms, and laboratories to visitors because of the serious interruption to the Museum's scheduled work. On this occasion, however, everything was made available and the staff made every attempt to acquaint the Members with their Museum.

Among the unusual attractions was "Bushman," the celebrated gorilla, which was then in the taxidermy shop in the last stages of preparation. Throughout the evening a large and enthusiastic crowd surrounded this exhibit and questioned the taxidermists concerning methods and problems of preparation. In all departments, however, visitors found much to wonder at. The only disappointment noted at any time during the evening was that lack of time prevented those present from seeing all phases of Museum work.

The success of the first Members' Night has given rise to the hope that such an event may be repeated.

EXPEDITION FINDS VICTIM OF SACRIFICE IN CLIFF HOUSE

By PAUL S. MARTIN
CHIEF CURATOR, DEPARTMENT OF ANTHROPOLOGY

THE SKELETON of a young victim of a sacrificial ceremony was found buried under the ancient walls of a cliff house by associated scientists and myself during the 1951 archaeological excavations for Chicago Natural History Museum in western New Mexico.

The evidence of the grim sacrifice consists of a headless skeleton of a young person,

THE 'DIG' IS A GIRL'S JOB, TOO

The unearthing and preservation of the bones of a prehistoric Indian woman, the victim of sacrificial rites, is partly the work of Elaine Bluhm, Museum staff member who participated in the 1951 Archaeological Expedition to the Southwest.

probably a female. Excavations in a cave, tucked away in a beautiful canyon through which a small permanent stream flows, had been under way for some time. At the mouth of the cave is a small one-room house, the walls of which are built of good masonry. The purpose of this isolated room is unknown, although we have made guesses concerning its purpose. At any rate, before the foundation for this one-room house was laid, the girl-victim was beheaded and her body (minus the head) was placed on the ground. The wall was built directly over it.

FIRST INSTANCE AT SITE

Although this is the first evidence of human sacrifice that our expeditions have uncovered over the years, such practices were fairly common among Indians in the New World. Among the ancient Mayas of Yucatan, maidens were thrown into a cenote or sinkhole to propitiate the gods and to bring good luck to the city of Chichen-Itza. The Pawnee Indians of the Plains used to sacrifice a maiden to the Morning Star. On ancient pottery bowls made by the Mimbres Indians, who lived just south of Pine Lawn Valley (where Dr. John B. Rinaldo, Assistant Curator of Archaeology, and I have for several years been carrying on archaeological researches), are found realistic paintings of victims being beheaded.

Dr. Paul S. Martin recently returned to the Museum after leading the Archaeological Expedition to the Southwest (his 17th expedition in the area). The 1951 excavations of prehistoric Indian caves were begun in June.

Thus it may be seen that human sacrifices are not rare. But the interesting fact is that this human victim is the first to have been uncovered for the Mogollon culture. In past seasons Museum scientists have found under walls ceremonial caches of pottery, turquoise, and shell bracelets but never before a human victim.

This find puzzles the archaeologists, for the building itself is small and isolated and *seems* unimportant. However, it is possible that the room might have served as a kind of outpost or watchtower, for it is located in a relatively narrow canyon, the head of which is high up in the mountains and the mouth of which debouches into the fertile and formerly heavily populated San Francisco River Valley. This canyon is a short cut used by modern horseback travelers who seek the shortest and quickest route out of this valley, over the Tularosa mountains and down into another valley, and it might have been used in ancient times by unfriendly peoples as an easy approach to a populous valley. Therefore an outpost or small fort would have been desirable. In it several sentries might have been stationed, who, at time of invasion, could have given alarm to the peoples below in the valley.

REASON FOR SACRIFICE

If this guess has any merit, it may explain the human sacrifice for the following reason: A fortress, in such a location, would have been useful, but its value might have been greatly enhanced by a ritualistic sacrifice of a maiden. The ritual might have been performed either to insure good luck to the builders or to please the god of war.

This unusual and weird discovery tops a summer of archaeological researches of great interest and significance. The cave itself yielded an abundance of specimens of the earliest prehistoric periods. In fact, more stone tools of the pre-pottery period (circa 2,700 B.C.–A.D. 1) were recovered this year than in eight previous seasons put together. The total number of stone tools alone runs above 1,500. In addition, tools made from bone and antler, leather objects, sandals, painted tablitas used as headdress in ceremonies, bows, arrows, cigarettes, matting, string, and fragments of basketry were recovered. These objects, along with those found during the season of 1950, will help clear up the origins and growth of the Mogollon culture.

Although the work was dusty and the cave difficult to reach, the rewards were great. The work this summer has unfolded another bit of the fascinating but little-known Mogollon culture.

A KIVA UNCOVERED

In addition to the excavations in Cordova Cave and the small cliff house, two other noteworthy tasks were carried forward this season.

One was the partial excavation, under the direction of Miss Elaine Bluhm, Assistant in Archaeology, of a large rectangular structure—a kiva, in all likelihood—in which religious ceremonies were observed. This kiva is unique in the valley, and therefore excavation of it is of great interest. Because of its large size (about 25 feet by 30 feet by 7 feet deep) and because of the tons of rocks that once composed the walls of the building and had toppled into it, digging has been very slow. At the close of the season about half of the excavation remained to be done, but it is possible to

CEREMONIAL BOWS AND ARROWS

These miniatures of the classical weapon of the American Indians were used in religious or puberty rites by Mogollon hunters about A.D. 1100. Excavated from a cave by the Archaeological Expedition to the Southwest.

announce that the roof timbers burned in prehistoric times and collapsed on the floor.

Although the fire was undoubtedly unfortunate for the Indians, it brings joy to the hearts of the archaeologists to know that the roof burned. The reason for this unholy rejoicing is that because of the fire everything that was in the kiva at the time of its destruction will still be there. We may expect to find pottery, tools, weapons, ceremonial objects, and even skeletons of people who might not have been able to escape. All these objects have been undisturbed and may permit us to obtain information about the ancient ceremonies. We shall complete the work on this kiva next year.

FINDS MANY NEW SITES

The other undertaking was a reconnaissance for new sites in western New Mexico and in east-central Arizona. This was in charge of Dr. Herbert C. Taylor, Jr., of Western Washington College, Bellingham, Washington, formerly a teaching assistant at the University of Chicago. Dr. Taylor's work was sponsored by the Department of Anthropology, University of Chicago, and was tailored to dovetail with the intensive investigations carried on by the Museum. Dr. Taylor spent ten weeks on this project, operating within a radius of eighty miles from the Museum camp, and found 75 sites of major importance. The analysis of the survey is yet to be made but a few tentative conclusions may be drawn from the data:

1) The late manifestations of the Mogollon culture (Reserve Phase) cover a large area—much larger than we had formerly realized. The results of the survey will be published next year.

2) The culture complex known as Mimbres extends at least as far northwest as Glenwood, New Mexico.

3) The region east of Springerville, Arizona, was a cultural transition zone between the Puebloan and Mogollon peoples.

HISTORY RECONSTRUCTED

On the basis of present information Dr. Rinaldo and I have tentatively reconstructed the history of the Mogollon Indians as follows:

About 5,000 years ago a band or two of Indians wandered into Pine Lawn Valley, western New Mexico, in search of food and water. Drought in their ancient homeland (southern Arizona) had forced them to move. Here in this valley they found water and an abundant supply of wild plants and seeds on which they lived.

About 3,000 years ago a primitive type of corn (pod corn) was introduced into the area and, soon after, beans and squashes. These food plants—agriculture, in other words—brought about spectacular changes in the lives of these Indians whom we call Mogollon, after near-by mountains of the same name.

Some 1,000 years later (about A.D. 1) the ideas of pottery-making and living in semi-subterranean houses (pit houses) were borrowed from progressive neighbors. During the next thousand years the house-form tended to remain the same, but the other

THE MODE IN SANDALS, 500 B.C.
Wickerwork footwear worn by the prehistoric Mogollon Indians in New Mexico. Excavated from a cave by the Archaeological Expedition to the Southwest.

arts flourished—pottery-making, weaving cloth, baskets, and sandals, and making weapons and tools of bone, wood, and stone.

About the time the Normans conquered England (A.D. 1066), profound changes in architecture and pottery took place in America. Pit houses went out of style, and in their place we find houses built on the surface of the ground with masonry walls. These houses were what we call multiroomed and were made up of two to twenty-five rooms. The pottery, too, reflects a change, for instead of bowls and jars decorated with designs done in red paint on a brown background, we find pottery designs executed with black paint on a white background.

FITTING PIECES TOGETHER

Many gaps in our knowledge of the history of Mogollon Indians still remain to be filled; but each season we add a little to our knowledge. Finally from our studies of the Mogollon culture we hope to achieve a bit of an understanding of the processes involved in the growth, flowering, and collapse of civilizations.

The discovery of a female who perished in a sacrificial rite and who was buried for reasons not clearly understood by us may seem trifling and of only passing interest. Yet this information is as valuable to us as the archives of a kingdom are to a historian. Any facts, domestic odds and ends, scraps and bits of wood, pottery, clothing, and the like provide us with contacts with the people of the past. We need all these miscellanea to piece together history and to make valid reconstructions. The urge to understand the nature of our civilization and others and to expand the frontiers of knowledge is very great and eminently worth while.

This is the eighth season that the Southwest Archaeological Expedition of the Museum has carried on researches in Pine Lawn Valley, western New Mexico. Staff members of the expedition, in addition to myself as leader, Dr. Rinaldo, Dr. Taylor, and Miss Bluhm, were Thomas Alder, photographer and assistant cataloguer, and Arnold Besser, Stanley Jones, Miss Marjorie Kelly, and Miss Elizabeth Morris, excavators. In nine earlier seasons other sites of a different nature were investigated by Museum expeditions.

CHILDREN'S FREE MOVIES ON SATURDAY MORNINGS

Four more motion picture programs for children will be given at the Museum on Saturday mornings during November. The entertainments, to be presented each Saturday at 10:30 A.M., will be given in the James Simpson Theatre, under the auspices of the James Nelson and Anna Louise Raymond Foundation. On one program, that of November 10, the picture, "Shangri-la Alaska," will be accompanied by a talk by Fred Machetanz of Kenton, Ohio, the explorer who made the film.

Children may come alone, accompanied by parents or other adults, or in groups from schools, etc. No tickets are needed.

Following are titles and dates of the programs:

November 3—AUSTRALIA'S BARRIER REEF
The fabulous coral growths and the underwater life shown under magnification
Also a cartoon

November 10—SHANGRI-LA ALASKA
Pioneering on the last frontier. Color motion picture and story by Fred Machetanz

November 17—PACIFIC ISLANDS
Life in Hawaii, Bali, and Tagaqe
Also a cartoon

November 24—ANIMAL LEGENDS
Also a cartoon

Audubon Society to Present Sunday Lecture, Nov. 18

The autumn series of free lectures to be presented in the James Simpson Theatre of the Museum by the Illinois Audubon Society will begin Sunday afternoon, November 18, at 2:30 o'clock. The opening lecture, "The Four Corners," by Fran W. Hall, head of the department of photography at Carleton College, will be illustrated with motion pictures in color. The general public is invited, and Members of the Museum are entitled to seats in the reserved section of the Theatre.

DALLWIG SUNDAY LECTURES BEGIN THIS MONTH

Paul G. Dallwig, the Layman Lecturer, resumes his Sunday afternoon appearances at the Museum on November 4. He will lecture each Sunday during the rest of the month and throughout December, January, March, and April (*skipping February because of an out-of-town lecture tour*). Mr. Dallwig's lecture subject in November is "Out of This World—For One Afternoon," to be given on November 11, 18, and 25, as well as November 4.

The opening lecture, which includes five dramatic episodes, covers the highlights of the strange world of millions of years ago when there flourished such weird plant and animal life as is represented in the new Hall of Fossil Invertebrates (Frederick J. V. Skiff Hall—Hall 37), which opened October 1, and Ernest R. Graham Hall of Fossil Vertebrates (Hall 38). The dramatizations are based on Museum expeditions that uncovered a huge dinosaur skeleton and other notable fossil specimens, a trip to a 250-million-year-old forest of the Coal Age, the death struggle of a prehistoric creature trapped in the La Brea tar pits of California, and a battle between a Tyrannosaurus and Triceratops, two of the most terrifying monsters in the Age of Reptiles.

On Sundays in December Mr. Dallwig's lecture will be "Gems, Jewels and 'Junk' "; in January, "Living Races and Their Way of Life"; March, "Money DOES Grow on Trees"; and April, "Life—What Is It?"

Members of the Museum may use their membership cards to attend these lectures without advance reservations. All others, with the exception of accredited representatives of the press, must make advance reservations to attend the Sunday lectures. Reservations may be made beginning October 1 by mail or telephone (WAbash 2-9410). The lectures are free. They start promptly at 2 P.M. and end at 4:30 P.M., including a half-hour intermission for relaxation or for lunch or a cup of tea or coffee in the Museum Cafeteria, where smoking is permitted.

NOVEMBER LECTURE TOURS DAILY EXCEPT SUNDAY

Tours of exhibits, under the guidance of staff lecturers, are conducted every afternoon at 2 o'clock, except Sundays and certain holidays. On Mondays, Tuesdays, Thursdays, and Saturdays general tours are given covering all departments. Special subjects are offered on Wednesdays and Fridays. A schedule of these follows:

Fri., Nov. 2—Indian Legends. Illustrated introduction in Meeting Room (*June Buchwald*).

Wed., Nov. 7—In the Beginning: Fossils and Their Living Past (*Anne Stromquist*).

Fri., Nov. 9—Agriculture—Foundation of Civilization. Illustrated introduction in Meeting Room (*Marie Svoboda*).

Wed., Nov. 14—How Animals Spend the Winter (*Lorain Stephens*).

Fri., Nov. 16—Feast Days and Fast Days. Illustrated introduction in Meeting Room (*Miriam Wood*).

Wed., Nov. 21—"Be It Ever So Humble": Housing Around the World (*June Buchwald*).

Fri., Nov. 23—Chicago's Prehistoric Past. Illustrated introduction in Meeting Room (*Anne Stromquist*).

Wed., Nov. 28—Nature's Super-Market: Roots, Seeds, Fruits, etc. (*Miriam Wood*).

Fri., Nov. 30—Chicago's Winter Birds. Illustrated introduction in Meeting Room (*Jane Sharpe*).

Parties for these tours assemble inside the North Entrance.

IT'S NOW TIME TO SUBMIT NATURE PHOTO ENTRIES

The Nature Camera Club of Chicago and Chicago Natural History Museum are ready to receive entries for the Seventh Chicago International Nature Photography Exhibition to be held at the Museum February 1 to 28, inclusive. The deadline for entries is January 14.

There will be two main divisions—prints and color transparencies. In each there will be three classifications: Animal Life, Plant Life, and General (the last includes nature manifestations, outside the specific classifications, and scenery).

Silver medals and ribbons will be awarded in the various print and slide classifications. Entry forms and a complete summary of conditions of the contest may be obtained from the Museum. Entries should be sent to the Museum.

FIFTY YEARS AGO AT THE MUSEUM

Compiled by MARGARET J. BAUER

From the *Annual Report of the Director* for the year 1901:

"The collections in Hall 79, devoted to ores of the base metals, have been completely reinstalled. The old cases were removed and new cases, purchased in part from the United States Commission to the Paris Exposition, substituted. These cases are constructed of mahogany and plate glass and represent a permanent style of installation. . . .

"The collections illustrating the metallurgy of iron, formerly occupying Hall 76, have been entirely removed, as they were somewhat foreign to the present scope of the Museum and the room was needed for other purposes. Collections and cases were presented to the Armour Institute of this city. In their place will be put the collections illustrating geographic geology, which include relief maps, globes, and other geographic material, and the space in Halls 60 and 61, formerly devoted to their exhibition, will be used to accommodate the expanding paleontological collections."

Hall 79—Ores of the Base Metals, Field Columbian Museum, 1901

Our Pacific Outpost . . .

LIFE OF THE CHAMORROS IN THE MARIANAS

By ALEXANDER SPOEHR
CURATOR OF OCEANIC ETHNOLOGY

SINCE World War II, Guam, Tinian, and Saipan are familiar names to Americans, even though many people may be a bit hazy as to just where these pieces of island real estate are located in the Pacific. The people who have inhabited these islands since before Magellan's time are less familiar. Who are they? Where did they come from? What are they like? The people of Guam today are American citizens, and since the passage of the Guam Organic Act after

GRINDING CORN

The Chamorros use the metate and mano, American Indian culture elements brought into their islands by the Spanish from Mexico.

World War II, pay the federal income tax and are subject to the draft as much as any city-dweller of Chicago, while as residents of the U. S. Trust Territory those who live on Saipan and Tinian are under an American administration. The United States is responsible for the welfare of these people. Their future is in American hands.

THE MARIANAS

Guam, Saipan, and Tinian are all part of the same island chain—the Marianas—that stretches in a shallow arc for approximately 450 miles north from Guam, the southernmost and largest island in the group. Located some 1,000 miles south of Japan and 1,400 miles from the Philippines, the Marianas are an American Pacific outpost on the virtual fringe of the Far East, and hence of strategic and political importance.

The people of the Marianas are called Chamorros. Influenced by long contact with Spain, as well as with America and Japan, the Chamorros of today are vastly different from the original Chamorros that Magellan saw and fought when he touched at Guam in 1521. The approximately 30,000 Chamorros that now live on Guam, Rota, Saipan, and Tinian—the principal islands in the Marianas—are largely westernized in culture, though they still preserve a core of Chamorro tradition and still speak their own language, which has nevertheless borrowed great numbers of loan words from Spanish.

ORIGIN OF THE CHAMORROS

What is known of the ancient Chamorros indicates that they migrated to their island home from the west. The Chamorro language belongs to the Malayo-Polynesian family that stretches from Malaysia across Micronesia and Polynesia. In culture, the Chamorros had numerous ties to Malaysia. They were rice growers and pottery makers—Malaysian traits that reached their easternmost penetration into Micronesia in the Marianas. In addition, the Chamorros raised taro and yams, which are Old World and Pacific Island food crops. They possessed the outrigger canoe in common with Oceanic and Malaysian peoples, while in warfare they used sharpened bamboo stakes to line traps for the unwary enemy. This use of bamboo stakes is also decidedly Malaysian.

After Magellan's discovery of the Marianas, the Spanish used Guam as a stopping point on the galleon run between Mexico and the Philippines, but did not actively colonize the islands until 1668. At that time a concerted attempt was made to convert the Chamorros to Christianity. The Chamorros resisted, and, in the manner of the period, Spanish efforts at persuasion were backed by the sword. A bloody war followed that lasted for thirty years, with victory finally going to the Spanish. Thereafter, the surviving Chamorros nearly became extinct, primarily through the ravages of introduced epidemic diseases to which they had slight resistance. The decimated population was able to recover, however, and through extensive intermarriage with Spaniards, Filipinos, and with migrants from other European countries, America, Japan, and China developed a racially mixed group that comprises the Chamorro people of today.

During the period of Spanish control, which lasted until the Spanish-American war, Chamorro culture became greatly modified by the influence of Spain. The Spanish priests introduced corn-growing from Mexico, together with the typical American Indian *metate* and *mano* for grinding corn, and such food dishes from Mexico as *tortillas*. Of other food plants likewise introduced, beans, squash, tomatoes, chili peppers, cucumbers, sweet potatoes, and tobacco are particularly important. The ox and two-wheeled Spanish ox cart were adopted. In religion, the Catholic church became a central part of Chamorro life. The old social organization became greatly modified and familial life absorbed many Spanish patterns.

LATER HISTORY

After the Spanish-American war, the United States acquired Guam but eschewed the remainder of the Spanish possessions in Micronesia. These were purchased by Germany, so that all the Marianas except Guam were under German control. This control shifted to Japan after World War I, and with World War II, the United States then assumed administration of the Marianas Islands north of Guam as part of the U. S. Trust Territory of the Pacific Islands, retaining Guam as an outright possession. As a result, the Chamorros of Guam are American citizens, whereas the Chamorros of the remainder of the Marianas are not, and have a somewhat anomalous status as residents of the Trust Territory.

Since the beginning of the twentieth century, the Chamorros of Guam have become increasingly affected by American contact. They are today bilingual, speaking both Chamorro and English. They dress in American style clothes, though many of the older women still prefer the colorful *mestiza* costume of the Philippines for church wear and festive occasions. They drink Coca Cola, listen to the radio, and go to the movies. Their children attend the George Washington high school and play baseball.

In the islands north of Guam, German, Japanese and now American influences have brought successive changes. Here, too, the

CLEARING FIELD OF WEEDS

Chamorro farmer has same problems as agriculturists elsewhere. He routs the weeds with his long-handled "fosinos" or scraping hoe.

Chamorros are bilingual, knowing Chamorro and Japanese. Since the war many have learned English too, while a few older linguistic virtuosos speak Spanish and German as well. Chamorro, however, is still spoken in the home and among themselves, and as on Guam the people are conscious of their Chamorro tradition, which though

mingling elements from many cultures, has still combined these elements into a unity.

World War II devastated the Marianas and it will be years before its destructive effects will be overcome. The people on Guam, because it is an American possession, have received compensation for wartime damages. Those of the other islands have

A CHAMORRO KITCHEN

Preparing a meat dish over an open hearth for a wedding dinner.

not been compensated, and today are attempting to reform their communities and build their lives anew, with the assistance of the American administration. In addition to its archaeological work, a principal objective of the Museum's 1949–50 expedition to the Marianas was to observe how community life was re-forming in relation to present problems of adjustment and to investigate the processes of culture change underlying the contemporary period on Saipan, Tinian, and Rota.

An Ancient Sea . . .

TEEMING PREHISTORIC LIFE RESTORED IN EXHIBIT

BY EUGENE S. RICHARDSON, JR.
CURATOR OF FOSSIL INVERTEBRATES

The fecundity of the sea is a matter of awe and wonder to modern man. Fishes, shrimps, kelp, oysters, and many other living things of direct value to us are to be had for the taking because the supply is renewed annually by the astounding reproductive capacity of ocean life. It is, perhaps, natural for us to conclude that all this is especially arranged for our benefit. But even before man arrived on the scene and started his campaign of using up the earth's natural resources, marine life was just as abundant. The connoisseur of sea food can look hungrily at the fat oysters and the juicy clams in the habitat groups of ancient life in the new Hall of Invertebrate Paleontology (Frederick J. V. Skiff Hall—Hall 37) and mourn that he wasn't around to enjoy them. Man or no man, the sea has been bountiful for half a billion years and will continue so indefinitely.

The record of the sea's abundance lies in the rocks deposited as mud and sand on its floor. Enclosed in these sediments are the hard parts of the animals that lived while the sediments were drifting to the bottom. Even the record of countless millions of microscopic animals and plants without hard parts is present, in bituminous rocks so full of organic matter that they will burn. But the record of life does not extend back to the oldest rocks we know on earth, although they, too, were once sediments on the ocean floor. Life, it seems, is not so old as our three-billion-year-old planet. It is not until we examine the rocks formed during the Cambrian period, beginning 540 million years ago, that we find the oceans supporting a full quota of plants and animals. But from that time to the present, teeming life has held sway.

The Ordovician habitat group shown on the cover of this issue of the BULLETIN is a good example of the crowded sea floor of millions of years past. In six square feet of ocean bottom are fifteen species of animals, not to mention a seaweed. Some of these are colonial corals and bryozoans that band together and build single structures for the housing of thousands of individuals. Counting these only by the colony, and the larger kinds individually, we find 153 animals in the group. We could have included twice as many without exaggerating the concentration that actually lived in the Ordovician sea.

A classic locality where Ordovician fossils are found is the vicinity of Cincinnati. Almost any piece of limestone from that area includes fossils crowded more densely than are the models in the Museum's group. Paleontologists have been collecting them for more than a century, and yet they seem as plentiful as before. Elsewhere in rocks of this age there is the same wealth of fossils —Nevada, England, Argentina, Ontario, even Southampton Island and Baffin Island on the Arctic Circle, where Chief Curator of Geology Sharat K. Roy made a large collection for the Museum in the late '20s and again in the early '40s.

Some parts of the oceans of today are not populated so densely as others, and that has also been true in the past. During the lifetime of the animals in this group, thick beds of sand and mud were being laid down in New York and Pennsylvania, and animals there were few. But the vastness of the sea is such that though part may be unfavorable, animal and plant life can always find some suitable area in which to exist in amazing abundance.

Visiting Hours Change

Museum hours, which have been 9 A.M. to 5 P.M. in the autumn, change to the winter schedule: 9 A.M. to 4 P.M., November 1 to February 28.

SATURDAY AFTERNOON LECTURES CONTINUE

The annual autumn course of free illustrated lectures on travel and science for adults will continue each Saturday throughout November. The lectures will be given in the James Simpson Theatre of the Museum and all will begin at 2:30 P.M. All of these lectures will be illustrated with color movies.

Limited accommodations make it necessary to restrict these lectures to adults. Members of the Museum are entitled to reserved seats on application. For children, free motion pictures will be presented on the mornings of the same Saturdays by the Raymond Foundation.

Following are the dates, subjects, and lecturers:

November 3—EARTHQUAKE LAKE
Reelfoot Lake, fascinating wilderness in Tennessee
Karl Maslowski

November 10—SHANGRI-LA ALASKA
Pioneering on our last frontier
Fred Machetanz

November 17—EXPLORATION IN NEPAL
Difficult journey to the high Himalayan kingdom
S. Dillon Ripley

November 24—ALGERIA
Sahara sand and oasis
Clifford J. Kamen

No tickets are necessary for admission to these lectures. A section of the Theatre is reserved for Members of the Museum, each of whom is entitled to two reserved seats. Requests for these seats should be made in advance by telephone (WAbash 2-9410) or in writing, and seats will be held in the Member's name until 2:25 o'clock.

NEW MEMBERS

The following persons became Museum Members from September 10 to October 5:

Associate Members

C. A. Crowley, Joseph Michael Newberger, Dr. H. R. Weinzimmer.

Annual Members

Oscar A. Barke, John L. Behr, John F. Brent, Carlos B. Bumzahem, James J. Cronin, William J. Connors, Elliott R. Detchon, Jr., William S. Everett, A. V. Farr, Albert Leo Finston, G. N. Fisher, Dr. John T. Hart, Mrs. C. M. Kittle, Elmer Krause, M. F. Lynch, William J. Lynch, Jr., R. E. Moore, Lawrence S. Newmark, Donald J. O'Brien, Mrs. Joseph Sam Perry, Jacob C. Pratt, Jr., Nicholas T. Ritsos, Frank E. Selz, Allen K. Sewell, Frederick C. Shafer, Dr. Leon S. Shalla, B. L. Smalley, John H. Smalley, Orville Taylor, H. J. Trainor, George H. Watkins, L. E. Wybel, Sidney R. Zatz.

Books

(All books reviewed in the BULLETIN *are available in The Book Shop of the Museum. Mail orders accompanied by remittance including postage are promptly filled.)*

A FIELD GUIDE TO THE SHELLS OF OUR ATLANTIC AND GULF COASTS. By Percy A. Morris. New and revised edition. Houghton Mifflin Company, Boston, 1951. xix+236 pages, over 400 illustrations, 102 in full color. Price $3.75.

In the January, 1948, number of the BULLETIN, page 8, we reviewed favorably the first edition of this book, which forms part of the "Peterson Field Guide Series." Now a second, somewhat enlarged edition of it has appeared, and the necessity of such a new edition is already sufficient proof of the favor Morris' guide to the shells has found with the public. The new edition, enlarged by more than 100 kinds of mollusks not contained in the first one and by the inclusion of the established common names of shells, wherever such a term has been in use, continues on the path of the happy medium between scientific accuracy and popular style; thus the little book will become equally helpful to the scientist and the layman interested in the subject. The rather moderate price enables almost anyone to secure a copy of a book that is as much of an adviser at home as it is an eloquent guide on the beach.

FRITZ HAAS
Curator of Lower Invertebrates

Technical Publications

The following technical publications were issued recently by Chicago Natural History Museum:

Fieldiana: Geology, Vol. 10, No. 11. *Fauna of Upper Vale and Choza:* 1–5. By Everett Claire Olson. August 28, 1951. 40 pages. $0.60.

Fieldiana: Zoology, Vol. 31, No. 50. *A New Ranid Frog (Staurois) from the Colony of Hongkong.* September 5, 1951. 4 pages. $0.10.

Fieldiana: Zoology, Vol. 31, No. 51. *Notes on Some Peruvian Birds.* By Melvin A. Traylor, Jr. September 5, 1951. 10 pages. $0.10.

Fieldiana: Zoology, Vol. 31, No. 52. *Non-Marine Shells from Borneo* (collected by the Borneo Zoological Expedition, 1950). By Fritz Haas. September 5, 1951. 6 pages. $0.15.

Fieldiana: Zoology, Vol. 31, No. 53. *New Species and New Records of Fishes from Bermuda.* By Loren P. Woods and Robert H. Kanazawa. September 14, 1951. 16 pages. $0.20.

Fieldiana: Zoology, Vol. 31, No. 54. *The Baculum of the Gorilla.* By D. Dwight Davis. October 12, 1951. 4 pages. $0.10.

Botanical Series, Vol. XIII, Part IIIA, No. 1. *Flora of Peru.* By J. Francis Macbride. October 17, 1951. 290 pages.

STAFF NOTES

Three members of the Museum staff participated in the recent ceremonies for the inauguration of Dr. Lawrence C. Kimpton, new Chancellor of the University of Chicago. **Colonel Clifford C. Gregg,** Director of the Museum was present as the representative of this institution. **Dr. Theodore Just,** Chief Curator of Botany, represented the Botanical Society of America, and **Karl P. Schmidt,** Chief Curator of Zoology, the American Academy of Arts and Sciences.

Mrs. F. S. (Meta P.) Howell, Librarian, was recently guest-speaker representing the Museum on the Elizabeth Hart radio program over station WMAQ .... **Dr. R. M. Strong,** Research Associate in Anatomy, was notified recently that "in recognition of 50 years' continuous membership in the American Association for the Advancement of Science" the Executive Committee has voted to make him a 50-year-member ....

Dr. Sharat K. Roy, Chief Curator of Geology, is on a study trip to principal museums in New York and Washington, D.C., in connection with the Museum's meteorite collection and the identification of material collected on his recent expedition to El Salvador .... **George Langford,** Curator of Fossil Plants, and **Eugene S. Richardson, Jr.,** Curator of Fossil Invertebrates, have returned from a ten-day trip to Tennessee and Mississippi, where they collected fossil plants from the Cretaceous and Eocene coastal-plain deposits and fossil invertebrates from the Cretaceous bed at Coon Creek, Tennessee .... **Dr. and Mrs. R. H. Whitfield,** Associates in Fossil Plants, have returned from a brief trip in southern Wisconsin to collect Cambrian and Ordovician fossil invertebrates.

Dr. Theodor Just, Chief Curator of Botany, attended the meetings of the American Institute of Biological Sciences held in Minneapolis from September 10 to 12. He participated in a symposium on "Phylogeny and the Fern-Pteridosperm Complex" with his paper on "The Geographical Distribution of Fossil Ferns and Pteridosperms" and presented a paper prepared in collaboration with Dr. José Cuatrecasas on "Synopsis of Fossil and Living Humiriaceae." Dr. Just has also been elected to membership in the American Society of Naturalists .... **Dr. Julian A. Steyermark,** Curator of the Herbarium, lectured October 11 before the Garden Club of Maywood and Broadview on "Plant Experiences in Guatemala."

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the past month:

Department of Anthropology:

From: Harold Abramowski, Chicago—10 stone artifacts, Wisconsin; Mrs. Isabel Coldren Smith, Glencoe, Ill.—5 American Indian ethnological specimens.

Department of Botany:

From: Dr. Fred Barkley, Tucumán, Argentina—8 Anacardiaceae, South America; Anthony Bialik, Chicago—13 cryptogams, Florida and Illinois; Carlos Bumzahem, Chicago—39 cryptogams, Michigan; Dr. Maxwell S. Doty, Honolulu, Hawaii—115 miscellaneous cryptogams; Harold B. Louderback, Argo, Ill.—68 cryptogams, Indiana; Dr. Valerie May, New South Wales, Australia—10 cryptogams, New Caledonia; New York Botanical Garden—22 algae, Puerto Rico; Colin C. Sanborn, Highland Park, Ill.—29 phanerogams, Arkansas; Mrs. Cora Steyermark, Barrington, Ill.—79 phanerogams, Missouri; Dr. Eula Whitehouse, Dallas, Tex.—86 North American algae, Texas.

Department of Geology:

From: Alick L. Carter, Kenmore, N. Y.—4 Devonian fossil fish specimens, New York; Claude Deo, Stratford, Iowa—4 specimens of Middle Silurian brachiopods, Saskatchewan, Canada.

Department of Zoology:

From: R. K. Benjamin, Urbana, Ill.—485 beetles, various localities; Chicago Zoological Society, Brookfield, Ill.—a Solenodon and a Mexican squirrel, various localities; Shelly Finn, Childersburg, Ala.—a collection of fresh-water shells, Alabama; J. Lear Grimmer, Chicago—4 bats, Illinois; Dr. Fritz Haas, Chicago—a collection of fresh-water shells, New York; William Hammond, Lake Forest, Ill.—a snake, Illinois; Lincoln Park Zoo, Chicago—a domestic cat and a mammal, Montana; James J. Mooney, Highland Park, Ill.—a squirrel and a lot of sucking lice, Highland Park; John M. Schmidt, Plainfield, Ill.—9 mammals, Wisconsin; Karl P. Schmidt, Homewood, Ill.—15 amphibians and reptiles, Wisconsin; Robert Sharp, Cicero, Ill.—a snake, Illinois; R. E. Stadelman, Villa Arteaga, Colombia—3 lizards and a snake, Colombia; U. S. Fish and Wildlife Service, Pascagoula, Miss.—26 lots of fishes, Gulf of Mexico; Dr. George C. Wheeler, Grand Forks, N.D.—4 salamanders, North Dakota.

Library:

From Dr. Maxwell S. Doty, Honolulu, Hawaii; Lloyd Library, Cincinnati; Karl P. Schmidt, Homewood, Ill.; Alexander Spoehr, Morton Grove, Ill.

Division of Motion Pictures:

From: John W. Moyer, Chicago—a 16mm color film.

Chinese Ceramics Studied

J. A. Pope, Assistant Director of the Freer Art Gallery in Washington, D.C., recently conducted research on the Museum's Chinese ceramics.

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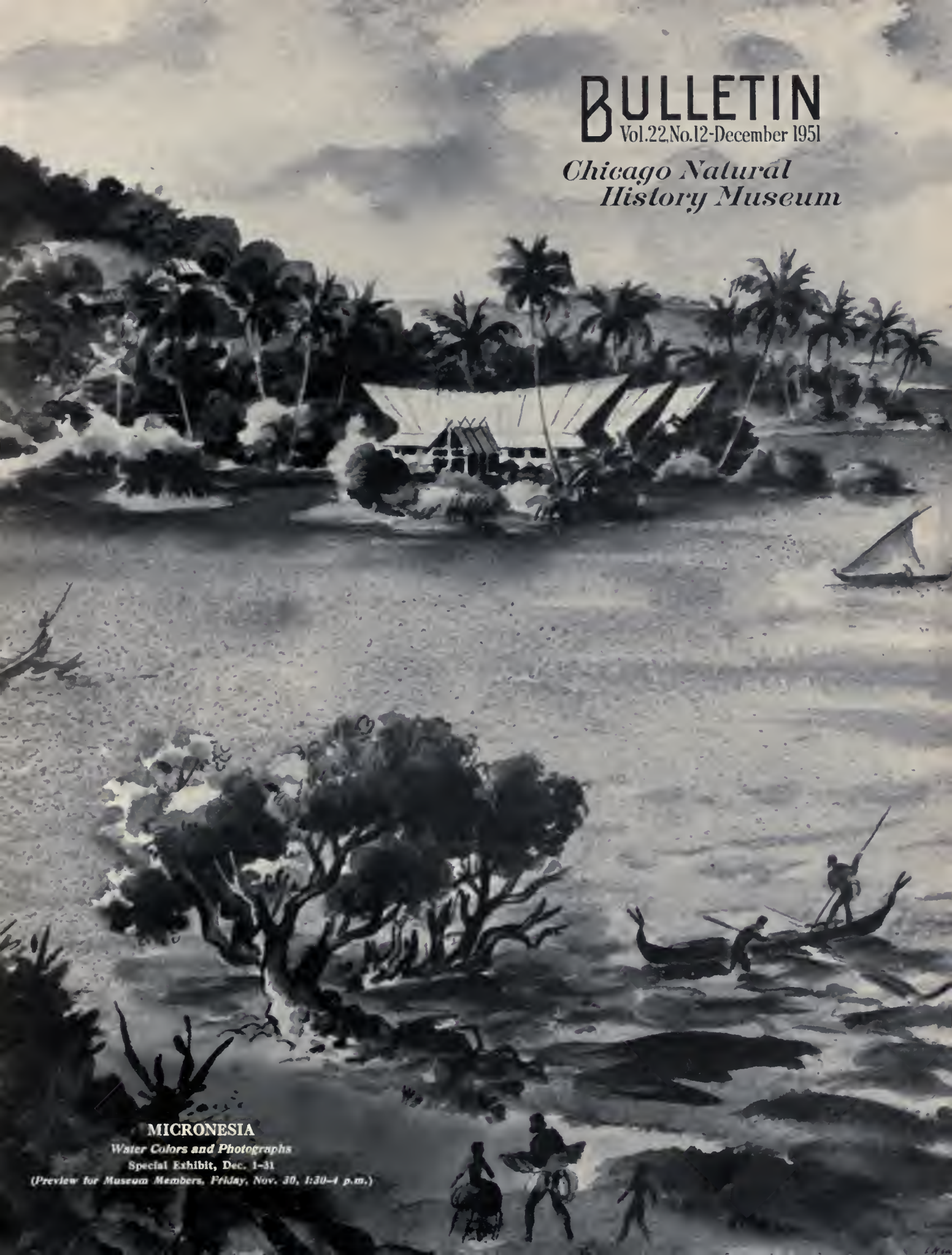

MICRONESIA

Water Colors and Photographs

Special Exhibit, Dec. 1–31

(Preview for Museum Members, Friday, Nov. 30, 1:30–4 p.m.)

Chicago Natural History Museum

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Members are requested to inform the Museum promptly of changes of address.

THE UNITED STATES AND THE PACIFIC

ALTHOUGH the gradual intensification of American relations with other peoples of the world has been a feature of the maturing of the United States as a nation, World War II and its aftermath has given this movement an acceleration that finds us thrust into a series of complex problems involving our relations with peoples in almost every part of the earth.

Our culture has grown largely from European roots and, although it has followed its own course of development, no great chasm in culture-pattern separates us from the western European nations. Across the Pacific, however, live peoples of a greatly different heritage and, despite the extension of westernization to the Asiatic continent, the differences between the Asian cultures and our own contribute in major degree to the difficulties we encounter in our dealings with the peoples of the Asiatic land mass. In addition, the island peoples of the Pacific, whose early history is tied to Asia rather than America, likewise present contrasts few Americans understand. Yet with these peoples of the Pacific and the Far East we must deal and, of necessity, attempt to seek a mutually satisfactory basis for future relationships.

As a result of World War II, the United States acquired control of the islands of the former Japanese Mandate in the Pacific. These islands now form the United States Trust Territory. The reason for assuming continued control is the strategic importance of the islands. But people live there too. As a country dedicated to democratic ideals, the United States cannot avoid responsibility for the welfare of the islanders. The area is no Pacific paradise cast in the form of a Hollywood vision. Its economy was torn to shreds by World War II. Transportation and services were completely disrupted. The American administration has been faced with serious problems in attempting the economic reconstruction of the Trust Territory. How well these problems are met is in large measure dependent

YAP NATIVE MAKING A FISH-NET

on how well the administrators understand the islanders and their cultures.

The Trust Territory, however, has not a large population, while as the administrating authority we do have control over the islands. The situation is perhaps less complex than our relations to the infinitely more populous lands to the west. But if the United States cannot do a good job in the Trust Territory, the prospects for satisfactory relations with the peoples of Indonesia, the Philippines, Japan, and the Asiatic mainland would seem to be correspondingly lessened.

The Museum has long maintained a scientific interest in the peoples of the Pacific and the Far East. As an educational institution, the Museum cannot presume to offer ready-made solutions to present problems arising from our relationships to these peoples. This is not our function. What we can do, however, is to aid in the diffusion of knowledge of these peoples—a knowledge essential to the solution of present problems—among the more than a million visitors that annually enter our halls. To contribute to an informed body politic is a major museum function. As a modest but important step in this direction the Museum offers in December a special exhibit in Stanley Field Hall on the peoples of Guam and the United States Trust Territory of the Pacific Islands (*see page 3*).

ALEXANDER SPOEHR
Curator of Oceanic Ethnology

THIS MONTH'S COVER

"Bay in Yap," a water color by Joseph Feher, is reproduced on our cover. This is one of a series of paintings by Feher that will form part of a special exhibit on the peoples of the United States Trust Territory and Guam to be featured in Stanley Field Hall of the Museum, December 1 to 31 (*see page 3*). There will be a special preview for Members of the Museum on Friday afternoon, November 30, from 1 to 4 o'clock. The paintings and photographs in the exhibit come here through the courtesy of the Honolulu Academy of Arts. They are supplemented by special exhibits from the Museum collections.

Human Skeletons

Age and sex differences of the human skeleton are illustrated in an exhibit in Chauncey M. Keep Memorial Hall (Races of Mankind—Hall 3). Included in the display are skulls, long bones, teeth, and pelves.

NEW MEMBERS

The following persons became Museum Members from October 8 to November 14:

Associate Members

Mrs. Donald R. McLennan, Sr., Miss Eleanor O. Olaison, Mrs. Suzette M. Zurcher.

Sustaining Members

Frank Dumelle, William C. Kraus, Earl Ross.

Annual Members

George E. Ackermann, Mrs. Amy G. Baldwin, Gilbert A. Beatty, Saul Bernstein, Allan E. Bulley, R. I. Chutkow, E. Hector Coates, Miss Shirley Conklin, Henriques Crawford, W. P. Enzweiler, C. W. Follett, William Friedlander, Mrs. Fred A. Healy, Thomas H. Healy, Mrs. Rosa M. Hohbaum, Harry G. Johnson, R. J. Jurgensen, Mrs. Frances J. Kaufman, Roy R. Laidley, George A. Lane, T. E. Marston, Mrs. J. H. McNabb, Louis L. Narowetz, Walter C. Otto, Edwin E. Pearson, Miss Kathleen Pearson, Miss Erna Schwandt, Dr. Henry S. Testin, Frederick J. Wachter, Harry N. Wyatt.

Special Exhibit, December 1–31 . . .

THE PEOPLES LIVING IN U.S. TRUST TERRITORY AND GUAM

By ALEXANDER SPOEHR
CURATOR OF OCEANIC ETHNOLOGY

DURING DECEMBER the Museum will present an exhibit on the peoples of the United States Trust Territory of the Pacific Islands and of Guam. The Trust Territory, Guam, and the adjacent Gilbert Islands (a British possession) constitute a major region of the Pacific called *Micronesia*, which covers some three million square miles of ocean dotted with small islands.

Although for four years American forces fought a series of bitter land, sea, and air battles across the vast expanse of the Pacific and although the names of islands virtually unknown in the United States before World War II are now in the common vocabulary, knowledge of the Pacific and of American responsibilities in this area remains confined primarily to specialists.

Today the United States, by virtue of the trusteeship created by the United Nations, is responsible for the well-being of the peoples of the United States Trust Territory as well as of those on Guam, an American possession since 1899. A principal purpose of the exhibit is to call the attention of the public to this American responsibility, to show visually the people who live on these islands, and to communicate the essential facts of their way of life. The exhibit is designed not as an academic curiosity but to serve an important educational function.

The Museum is fortunate in securing for this exhibit a splendid series of paintings and drawings by Joseph Feher and photographs by Raymond Sato, assembled and generously loaned by the Honolulu Academy of Arts. These depict the peoples and island setting of the Trust Territory and Guam. The background of island culture is further portrayed by exhibits of material from the Museum collections. The photographs on this page and page 2 are by Raymond Sato.

Prior to the opening of the exhibit, a special preview will be held from 1 to 4 o'clock on the afternoon of Friday, November 30, for Museum Members and their guests. Dr. Alexander Spoehr, Curator of Oceanic Ethnology, and Phillip H. Lewis, University of Chicago Museum Fellow, will be present in Stanley Field Hall to answer questions.

YAPESE GENTLEMAN AT SOLITAIRE; CHILDREN 'KIBITZING'

A PONAPE FAMILY IN OUTRIGGER CANOE

ON SAIPAN THERE IS NO HURRYING

A HOME ON A PACIFIC LAGOON

Museum Admission Tax Removed

Effective from November 1, by act of the recent Congress, the 20 per cent federal tax on museum admission charges, imposed since October 1, 1941, is no longer to be collected.

CREATIVE ARTISTRY IN NEST BUILDING

By AUSTIN L. RAND
CURATOR OF BIRDS

"As to what its significance is we have no idea" is how I ended a survey of the seven (now eight) cases in which certain bird species characteristically use snakeskins in their nests (BULLETIN, December, 1949, page 6). Since then, I've had a clue to the riddle. Unpacking a bird collection made

'SIMULATION' OF SNAKESKIN

The nest of a Borneo bulbul showing dead leaves used in the margin of the nest. This material in texture and appearance somewhat resembles snakeskin.

in Borneo by Curator of Anatomy D. Dwight Davis, I took out a bulbul's nest. In its outer edge were flat, weathered leaves that resembled snakeskins. Later, when we received a bird collection from Dr. D. S. Rabor of the Philippines there was another nest of another species of bulbul and this, too, had flat, dead, weathered leaves in it that looked like snakeskin. When I was in Madagascar, in 1929–31, I had found three nests of the Madagascar bulbul, with a snakeskin used in each. Here was a clue. I decided to investigate the nests of the other species of bulbuls of southern Asia and Africa where the family is represented by many species. By considering the snake-

MORE 'SYNTHETIC SNAKESKIN'

The nest of a Philippine bulbul with dead leaves somewhat resembling snakeskin used in the base of the nest.

skin-using species against the background of the nesting of the other species, some correlation might appear.

This became a library problem at once. I had to look up the earlier reviews of the problem in the ornithological journals, *The Auk* and the *Ornithologische Monatsberichte*, then in Strong's *Bibliography of Birds*, to make sure that no important papers were missing from my own subject file. Stuart Baker's *Fauna of British India, Birds* had a large part of one volune devoted to bulbuls, and gave excellent summaries of the nidification of each species occurring there. Bannerman's *Birds of Tropical West Africa* covered the western part of that continent, and Jackson and Sclater's *Birds of Kenya Colony* did the same for the eastern part. For collateral material I looked in Mathews' *Birds of Australia*, Volume 12, Forbush's *Birds of Massachusetts* and Mrs. F. M. Bailey's *Birds of New Mexico* and a dozen minor publications.

But it was worth it.

Perhaps my earlier thinking was dominated by the thought that the shed snakeskins had been parts of animals toward which many birds show a natural antipathy. But it's extremely probable a bird does not recognize the snakeskin as such. Rather to it the shed snakeskin is a strip of thin, flexible material. Obviously it would be used, by chance, by many bird species, such as the house wren that in addition to such natural materials as twigs, grass, and hair has been recorded as using lead pencils, paper, nails, safety pins, and snakeskins in its nest.

USE OF ACTUAL SNAKESKIN

Crested flycatcher's nest in Museum exhibit.

As to the regular users of snakeskin, the snakeskin-using Madagascar bulbul did fit into a pattern. Bulbuls in general make characteristic simple cup nests. Some species use almost any available material. But quite a few species had specific choices of materials: one species' nest had tendrils of vines in its base; another a lining of grass heads of certain color; another pine needles; another red dead leaves; and the Madagascar bulbul snakeskins.

There seems to be a tendency for many species to make distinctive nests. They often accomplish this by a choice of material used by few or no other species. What more natural than that one species, being in a country where snakes are common, should hit on shed snakeskins!

To show that the choice of snakeskin as nesting material is an expression of a tendency for each species of bird to make a different kind of nest may not be much of an answer. But it is to an extent. No longer do we say, "Why are certain birds' nests characterized by snakeskins?" Rather we have the broader, more general question, "Why does each kind of bird tend to build a nest different from that of every other kind?" Thus, little by little, we clear away small, vexing questions and resolve them into larger, more general questions. For answers to these we sometimes plan extended work involving field studies, studies of specimens and books. And sometimes, as we examine a specimen, read a paper, or unpack a shipment, an answer, or at least a clue, springs to our mind.

An Ancient Reptile . . .

COTYLORHYNCHUS ARRIVES FROM OKLAHOMA SITE

By WILLIAM D. TURNBULL
PREPARATOR, DEPARTMENT OF GEOLOGY

Some 240 million years ago much of Texas and Oklahoma was traversed by broad rivers bordered by extensive swampy areas. The climate in those remote Permian days in the North American Southwest was warm, humid, and semitropical. The rivers were laden with silt, which was deposited on the deltas and, in flood time, along the flood-plains. The country abounded in plant and animal life and often the remains were buried in the mud to be preserved as fossils in hardened mudstone. Occasionally, during high floods, some animals were buried beneath thick mud deposits. Their skeletons were saved from the ravages of currents and scavengers and so were preserved intact.

Cotylorhynchus romeri is the name given to one of these Permian animals, a member of the great reptilian order Pelycosauria, that lived in the rivers and swamps in the vicinity of what is now Norman, Oklahoma. This animal has a remarkably small, short skull, connected by a stocky neck to a relatively huge, low, barrel-shaped trunk. The teeth are blunt, indicating a herbivorous diet. So disproportionate is the skull to the rest of the body that the beast must have spent a large part of its time engaged in the mechanical process of ingesting sufficient food through its small mouth to nourish its large body. The limb-bones are short and very broad, indicating a sluggish, plodding type of locomotion. The bulky extremities also suggest that *Cotylorhynchus* was dependent upon the buoyancy of swamp and river waters to help support its great weight, estimated to have been one-third of a ton. With a tail about equal in length to the rest of its body, the total length of adult individuals was between 10 and 12 feet. Little *Casea* (soon to be exhibited in Ernest R. Graham Hall—Hall 38), closely allied to *Cotylorhynchus* and found in earlier Permian deposits of Texas, reached a length of but four feet and was much lighter in build than its large relative.

Cotylorhynchus is represented by twenty-seven skeletons, which were discovered by

Dr. J. Willis Stovall of the University of Oklahoma, where several of the specimens are on display. The paleontological staff of Chicago Natural History Museum was anxious to obtain one of these interesting forms for comparative study and to add to the extensive collections of Texas pelycosaurs. It was arranged that during September a joint party from the Museum and the University of Chicago be sent to collect a skeleton, indications of which were found some years ago by Dr. Stovall. The writer was accompanied by Richard Konizeski, of the Department of Geology, University of Chicago.

The site of the field operations was an abandoned pasture, dissected by erosion, with many outcroppings of red mudstone. In one of the gullies, fragments of bone were found in abundance. The collectors immediately set to work with ice-picks and awls, chipping away the crumbly rock to expose the skeleton. The first parts of this *Cotylorhynchus* to appear were the ribs. As the work progressed, the vertebral column, the limbs, and the pectoral and pelvic girdles were gradually uncovered. It soon became evident that this was an exceptionally well-preserved specimen, nearly complete, save for the skull and jaws that had apparently weathered out some years ago. The extremities—the curled-up toes and the small vertebrae at the tip of the long, curving tail—were found to be essentially complete. Of particular scientific interest is the dermal armor of gastralia, or belly ribs, which is better preserved in this individual than in any of the previous finds.

As the fossil was exhumed, a thin solution of shellac was poured on the bone to harden it. When the full extent of the skeleton was finally determined, a plaster-of-paris jacket was carefully put on to protect the fossil during the long journey back to the Museum. It required the use of a tractor and four sets of strong arms to load the 1,000-pound specimen into the field truck. *Cotylorhynchus* now lies in the paleontological preparation room.

1,200 4-H Boys and Girls On Tours of Museum

More than 1,200 boys and girls of the 4-H Clubs, national farm-youth organization, visited the Museum on November 27 and were conducted on tours of the exhibits by staff lecturers of the Raymond Foundation and members of the scientific staff.

The youngsters, representing nearly all states of the Union and the provinces of Canada, were delegates to the National Congress of 4-H Clubs, which meets in Chicago every year at the time of the International Livestock Exposition. Those who come are chosen in their local communities for excellence of achievement. For many years their visit to the Museum has been a repeated occasion.

VENEZUELAN PLANT PITH USED IN NATIVE CARVING

By JULIAN A. STEYERMARK
CURATOR OF THE HERBARIUM

Most tourists who visit Venezuela know its capital city, Caracas, better than any other place in this interesting South American country. If they travel westward from Caracas along the Andean highway, they will come eventually to Mérida, the largest town in the Venezuelan Andes. Surrounded by the highest peaks of the Andes in Venezuela, it nestles in a valley at an elevation of approximately 5,000 feet (1,641 meters). Potatoes and wheat are grown in the cooler climate predominating in the vicinity. A native staple, similar in shape and flattened like the well-known *tortilla* of Mexico and Central America but made from wheat flour instead of corn, is commonly eaten in this area.

ANIME PITH CARVINGS
Specimens show fruits carved from pith of the Venezuelan anime plant.

One of the products, used in native handicraft peculiar to this part of the Andes, is known as anime. The name is applied to various species of the Compositae, a family that includes such familiar plants as aster, daisy, goldenrod, chrysanthemum, dahlia, sunflower, artichoke, and thousands of others. While the plants called anime resemble one another in general appearance because of their tall thick stems with opposite large leaves and yellow or yellow-and-white flowers, they can actually be referred to at least four different species.

In the course of my botanical collecting in Venezuela I found anime to be represented by two species of the genus *Montanoa* (*M. Lehmannii* and *M. quadrangularis*) and two species of the genus *Polymnia* (*P. eurylepis* and a species new to science soon to be published in the Museum's scientific series). Although these four differ in many respects and are easily detected as distinct from one another, they all have one feature in common, namely a soft whitish or pale-colored *pith*. The pith, as is well known, is the soft central portion of the stem, usually spongy in texture and easily cut. Most herbaceous as well as woody plants possess pith, but in some it is of greater extent or of firmer texture than in others.

In the case of the anime plants of Venezuela, pith is well developed and quite soft. It is similar to the pith of the stems of our common elderberry (*Sambucus canadensis*), but attains greater thickness. The inhabitants of Mérida and elsewhere in the Venezuelan Andes have learned that they can easily fashion this pith into numerous objects of great delicacy and beauty. Hand-carved by small knives and then colored to appear life-like, these articles may represent fruits of various kinds, orchids growing on a log, roses, miniature houses, etc.

Anime is lighter than cork. Sometimes one sees bundles of stems being collected to use for this carving, a remarkable art not often appreciated by the ordinary tourist. Carvings of this kind are not limited to the Andean towns but can also be found in Caracas itself, as one species of anime grows in the surrounding hills. Sometimes the different species of anime are designated by the local inhabitants as anime blanco, anime manso, etc.

It is interesting to note that the genus *Polymnia* is also found in the eastern half of the United States and that it is represented by two species in Illinois. In these, however, the stem is quite slender and the pith is only slightly developed as compared with the thick-stemmed species of Venezuela.

ANIME PITH USED IN ART
Reproduction of an orchid plant (Cattleya mossiae), showing its epiphytic habit of growth on a piece of wood. Made by a native Venezuelan artist entirely out of the pith from an anime plant.

EXPLORING GUATEMALA'S THRIVING INSECT COMMUNITIES

By RODGER MITCHELL

SOME of the most interesting and profitable collecting of the Museum's expedition to Guatemala in 1948 was done at Finca el Zapote in the middle of one of the more heavily worked agricultural areas. The climate and location of the western slope of the Pacific escarpment of the Guatemala plateau, boldly marked by its chain of volcanoes, is ideal for the growth of one of the principal crops of the country, coffee. Most of the land that can be profitably farmed is in use. Grazing is extensive, and remnants of the original vegetation and animal life can be found only high on the volcanic slopes or in locally inaccessible terrain. But I cannot remember having seen any slopes inaccessible to the farming methods of the Guatemalan Indians.

The relationships of the original flora and fauna have been obscured; some forms of life rare before man's interference are now abundant, but many forms once common are now nearly extinct. For the entomologist this is a matter of concern but not necessarily discouraging because even in the areas of man's greatest interference in Central America there is a rich, varied, and little-understood assemblage of insects. It is unfortunate that so few areas exist today in something approaching a natural state. There are regrettably few opportunities for us to acquire the knowledge necessary to describe and understand the changes in plant and animal populations that occur where man claims lands for his own purposes.

Through the generosity of F. Lind Pettersen of Finca el Zapote we were given much help, and complete freedom in our investigations. The lands of the finca (a Spanish name equivalent to plantation) extended from high on Volcan de Fuego to the lower part of the coastal plain. The principal crops were coffee and quinine. Coffee occupied the middle grounds, below 4,000 feet and little lower than 3,000 feet. The cinchona trees, which produce the quinine, grow in long crowded rows at an elevation usually in excess of 4,000 feet. The lands not devoted to these crops were used for pasture, other minor crops, or were covered with a more or less modified forest.

UNSYMPATHETIC HORSES

In order to look over the finca lands we were provided with horses. The foreman gave us the supposedly better mounts, which responded poorly to inexperienced riders and took a very dim view about carrying an entomologist with his rattling accumulation of bottles and vials, to say nothing of unfamiliar waving bug nets. After the first dismounting to rummage around an old tree stump I found the horse unwilling to allow me to remount, leaving no alternative but to lead him back. It was apparent that an older, less discriminating horse would serve me best.

One of the most interesting collecting places on the finca was an area of recently cleared land in which the logs had been left out in the open. A tremendous fauna of insects had developed in the logs. Many logs were covered with little piles of sawdust pushed up by the insects boring in the wood, and the ground underneath some of the logs was blanketed with this sawdust. The combined effect of the thousands of insects chewing away at the logs made a noise not unlike the crumpling of cellophane. I was at a loss to know the source of the noise at first, for one hardly expects that the chewing of insects could make much noise. Many hours were spent among these logs and probably the greater proportion of the log-boring insects and their associates collected on the trip came from this small area. In collecting insects, very often the discovery of just one such ideal spot can make an entire trip worth while. Only occasionally does one find just at the right time a spot where, for some reason, one kind of insect is peculiarly abundant.

The Guatemala Zoological Expedition of Chicago Natural History Museum was in the field from mid-April to the end of August, 1948. Illness forced the leader of the expedition, Rupert L. Wenzel, Curator of Insects, to return within a month. The writer of this article, Rodger Mitchell, an entomologist, and Louis de la Torre, the mammalogist, both graduate students at the University of Michigan, carried on the field work for the remaining time of the expedition.

The more time one spends collecting in one spot for special things the more interesting and enjoyable it becomes. Here among the logs it became apparent that there was a very complex community in each of these logs. Boring beetles ate the wood, a tremendous growth of yeasts and fungi supported many kinds of insects in abundance, and another entire assemblage of parasites and predators lived at their expense. A whole complex of these animals lived together in one log, almost independent of the other living things about them, with their numbers delicately regulated so that all could survive without destroying each other. Over and over again in all kinds of circumstances one is impressed with these small sharply defined communities that compose the larger and much more complex and obscurely defined major communities. These smaller communities fit together and are integrated with each other in the over-all view.

The coffee groves with their protecting cover of larger shade trees were very good places for collecting leaf-feeding insects. Most of the coffee trees were under eight feet in height and formed a dense shrub-like growth. Between the well-spaced coffee trees a low herbaceous growth was allowed to develop. Twenty or thirty feet overhead the dissected leaves of the leguminous trees spread a delicate lacy shade that protected the coffee flowers from the wind and rain but still allowed enough sun through to ripen the coffee berries to a bright Christmas red.

VAST NUMBERS OF SPECIES

Paths and roads lead through the coffee trees and along these many flowers grew, each attracting a host of insects. In these open areas a net could be used to advantage for flying insects like butterflies and for general sweeping of the vegetation. Snout beetles and leaf beetles are among the most abundant groups of insects in such situations. There are so many species in the tropics that there are not nearly enough specialists to identify more than a few of the groups. Each plant feeder appears at a particular place on the plant of its preference and usually has a definite behavior pattern. A moving shadow or the slightest jar causes certain insects to drop to the ground, whereas others respond to the same stimuli by flying off. Some fly straight up, others to the side, and some gain air speed by dropping down.

If you know the insect's inflexible behavior pattern, the killing jar can be so held that the insect will helplessly fly right into it. The response of insects to temperature is obvious to all those who have done any amount of insect collecting, for as the day gets hotter it is harder and harder to be quick enough to get the insects before they take off. The best way to get large numbers of the plant feeders, and many other insects, is by sweeping. With a strong heavy net one just sweeps the vegetation. At the bottom of the net there is always a mass of leaves, twigs, seeds, and hundreds of insects.

It takes several days' work at the Museum to prepare all the insects collected in fifteen minutes' sweeping; so we are often forced to select those forms both in the field and at the Museum that are of particular importance in our lines of interest. The butterflies were particularly abundant in two places on the finca. Many flowers grew by the wayside where a road led through a narrow stretch of woods. Early in the morning there was a host of interesting

butterflies on the flowers. But for variety and interest the butterflies that flocked by the mudpuddles of the road far surpassed those of the flowers. Moist spots are great gathering places for many butterflies and around the Chicago area many butterflies, though few species, can be found at muddy spots. In Guatemala there might easily be twenty species at a single such spot. The other place to see butterflies was the cinchona groves. Cinchona flowers have a rich, sweet odor and attract many insects. The trees are just high enough to be out of reach and collecting was difficult and disappointing in these groves.

HUNTING GROUND FOR INSECTS

The lands of Finca el Zapote occupy the west slope of Volcan de Fuego where altitudinal and topographic differences make it possible to collect in many different situations.

FUNGI YIELD SPECIMENS

The disappointment over the butterflies being just out of reach was counterbalanced by the abundance of fungi. Cinchona trees are planted close together and the undercover cleared so that on the shaded, clear ground it was easy to see the fungi. Insects in great variety are found on fungi. Many beetles feed on them, and one group of tiny beetles eats only the microscopic fungus spores. Fly larvae bore in and feed on the fungus body. All, of course, have their parasites and predators. Every member of the complex fungus assemblage has peculiar modifications and behavior patterns. In each clump of mushrooms we have another complex integrated community. It is not surprising that we have such great difficulty understanding the ecology of a forest or a prairie when each one of these big units contains so many complex smaller units. In collecting small, active insects, like most of the fungus dwellers, an aspirator is used. The aspirator is a vacuum-cleaner-like apparatus. By sucking on it you draw the insect up into a bottle and after the collecting is completed the insects are transferred into a vial of preservative.

Our hostess, Mrs. Pettersen, discovered a colony of stingless bees in a hollow tree in her back yard. These bees, not distantly related to the familiar honey bee, build combs of trash masticated and mixed with a small amount of wax. Otherwise they collect honey and act quite like ordinary honey bees. The fact that they are stingless had attracted the attention of apiarists and certain species are being studied for possible use in the honey industry.

When we were called back to the vicinity of the tree, the bees immediately swarmed out, viciously buzzing about and crawling into our hair in a most menacing manner. Our antics in response to this were spontaneous, and the source of much amusement. The bees were so tangled up in our hair that they had to be combed out. It is hard to avoid comparing the behavior of these bees with that of the harmless hognosed snake, which is more menacing and aggressive than are the truly dangerous snakes. These stingless bees certainly acted with more vigor than their stinging relatives, and our response was evidence that this can be effective protection for them.

In the tropics a good bit of collecting may be done in populated agricultural areas. This does not mean that unexplored areas are avoided—on the contrary, they are extremely attractive. In both undisturbed natural regions and in various niches in cultivated areas scores of new species are still to be found, each discovery contributing to our knowledge of the history and evolution of a group of insects. As we collect these insects about which so little is known we can see that each species is an integral part of a community. The marvelous and intriguing relationships of living things to each other and to their environment are in fact as fascinating to observe in our back yards and forest preserves as in the tropical rain forests and Guatemalan plantations.

MERRY CHRISTMAS and HAPPY NEW YEAR

The Museum will be closed on both Tuesday, December 25, and Tuesday, January 1 (Christmas and New Year's Day), so that Museum employees may spend the holidays with their families. These are the only days in the year when the Museum is not open.

STAFF NOTES

Rupert L. Wenzel, Curator of Insects, left Chicago recently for an extended tour of European museums to study beetles of the family Histeridae. He will go first to Vienna to supervise the packing of the Bernhauer Collection of staphilinid beetles recently purchased by this Museum. He will visit Genoa, Paris, and the British Museum in London .... **Loren P. Woods**, Curator of Fishes, returned to his desk from a brief trip to southern Illinois to collect cave fishes and their relatives .... **Robert F. Inger**, Assistant Curator of Fishes, made a trip to southwestern Missouri, where he collected not only cave fishes but salamanders, crustaceans, and flatworms, all remarkable for their loss of color in the cave environment .... **Emmet R. Blake**, Associate Curator of Birds, attended the meetings of the American Ornithologists' Union held in Montreal .... **Ronald J. Lambert**, Assistant Taxidermist, presented a paper on "Supplies for the Preparation of Museum Exhibits" at a meeting of the Midwest Museums' Conference in Springfield, Illinois.

GIFTS TO THE MUSEUM

Following is a list of the principal gifts received during the past month:

Department of Anthropology:

From: Orlin I. Wahl, Evanston, Ill.—5 artifacts, McHenry County, Illinois.

Department of Botany:

From: Bishop Museum, Honolulu—31 phanerogams, Hawaii; Dr. C. S. Nielsen and Dr. Grace C. Madsen, Florida State University, Tallahassee—147 algae, Florida and Louisiana; J. Francis Macbride, Stanford University, California—83 algae, California; Floyd Swink, Chicago—136 phanerogams, Illinois and Indiana; John W. Thieret, Chicago—187 phanerogams, Utah and Indiana; E. J. Palmer, Webb City, Mo.—209 phanerogams, Missouri.

Department of Zoology:

From: John G. Shedd Aquarium, Chicago —50 fishes; Dr. George Bevier, La Paz, Bolivia—12 mammals (rodents), Bolivia; Owen Bryant, Steamboat Springs, Colo.—11 true bugs, Colorado and Arizona; Chicago Zoological Society, Brookfield, Ill.—a mammal (baby sitatunga), Africa; George L. Chindahl, Maitland, Fla.—approximately 400 magazine and newspaper pictures of animals (various); Dr. B. E. Dahlgren, Chicago—a snake (*Typhlops lumbricalis*), Cuba; Lloyd G. Gage, Wilmette, Ill.—a collection of African marine shells, Africa; Harry Hoogstraal, Cairo, Egypt—3 lots of land shells, Egypt; Dr. James Kezer, Stillwater, Okla.—15 salamanders, Oregon; Allen M. Lipscomb, San Marcos, Tex.—2 frogs (*Acris crepitans*), Texas; Dr. Clarence R. Smith, Aurora, Ill.—a weasel, Illinois; Walter F. Webb, St. Petersburg, Fla.—two lots of African land shells, Africa; School of Fisheries, University of Washington, Seattle —23 fish specimens of genus Oncorhynchus, representing five species.

FIFTY YEARS AGO AT THE MUSEUM

Compiled by MARGARET J. BAUER

From the *Annual Report of the Director* for the year 1901:

"In Hall 65, devoted to structural geology, an exhibit of cave formations and cave life has been prepared. Stalactites, stalagmites, and other cave formations from several well-known caves of the United States have been mounted in their natural position and a

OLD-TIME CAVE EXHIBIT

Subterranean limestone products, particularly stalagmites and stalactites, as exhibited in a hall of Field Columbian Museum in 1901.

realistic setting corresponding in form and details to a typical limestone cave given. Accessories illustrating water, and animals which live in caves, such as bats, blind fish, crayfish, and crickets, are also used. The whole illustrates the nature and manner of growth of limestone cave formations and the living forms which characterize such caves."

DALLWIG SUNDAY LECTURES ON GEMS AND JEWELS

Paul G. Dallwig, the Layman Lecturer, will talk at 2 o'clock each Sunday afternoon throughout December on "Gems, Jewels, and 'Junk.'" Starting with the superstitions that led to the custom of wearing gems as charms against evil, against illness, to bring good luck, or to further the cause of love, Mr. Dallwig will go from the reasons we value gems to how we obtain them. He will trace precious and semiprecious gemstones from their origins in matrix rock to their ultimate resting places in the jewelry store, museum collection, or personal jewel chest. This lecture also tells how imitation and synthetic gems are produced and how to test them for their artificiality.

By press time Mr. Dallwig had received more than 12,000 advance reservations for his current series of Sunday afternoon lectures, which will continue through April (*excepting February*, when Mr. Dallwig will be on an out-of-town lecture tour). Arrangements have been made to accommodate larger audiences for these Sunday lectures than in the past, although attendance is still limited to adults. The lecture for Sundays in January will be "Living Races and Their Way of Life"; in March, "Money Does Grow on Trees"; and in April, "Life—What Is It?"

Members of the Museum may use their membership cards to attend these lectures without advance reservations. All others, with the exception of accredited representatives of the press, must make reservations in advance. Reservations may be made by mail or telephone (WAbash 2-9410). The lectures are free. They start promptly at 2 P.M. and end at 4:30 P.M., including a half-hour intermission for relaxation or for tea or coffee in the Museum cafeteria, where smoking is permitted.

NATURE PHOTO CONTEST NEARING DEADLINE

Several weeks remain in which to submit entries for the Seventh Chicago International Nature Photography Exhibition to be held at Chicago Natural History Museum February 1 to 28, inclusive, under the joint auspices of the Nature Camera Club of Chicago and the Museum. January 14 is the deadline for entries.

Judges for the contest, whose decision will be final, are: John Bayalis, Chief of Division of Photography at the Museum; D. Dwight Davis, Curator of Vertebrate Anatomy at the Museum; Ragnar Hedenvall, APSA, photographer; Betty Henderson Hulett, APSA, photographer; Floyd Swink, nature lecturer.

DECEMBER LECTURE TOURS DAILY EXCEPT SUNDAY

Tours of exhibits, under the guidance of staff lecturers, are conducted every afternoon at 2 o'clock, except Sundays and certain holidays. On Mondays, Tuesdays, Thursdays, and Saturdays, general tours are given covering all departments. Special subjects are offered on Wednesdays and Fridays. A schedule of these follows:

Wed., Dec. 5—Land of the Mummies (*Lorain Stephens*).

Fri., Dec. 7—Trees in Winter. Illustrated introduction in Meeting Room (*Miriam Wood*).

Wed., Dec. 12—Tales of Spice Roads: Ancient and Modern Routes of Trade (*Marie Svoboda*).

Fri., Dec. 14—Fossil Hunting: On Museum Expeditions and On Your Own. Illustrated introduction in Meeting Room (*Anne Stromquist*).

Wed., Dec. 19—Sacred Animals (*Jane Sharpe*).

Fri., Dec. 21—Fashions in Food: Effects of Food Customs on People. Illustrated introduction in Meeting Room (*Marie Svoboda*).

Wed., Dec. 26—Eskimo Life (*June Buchwald*).

Fri., Dec. 28—Strange Sea Animals. Illustrated introduction in Meeting Room (*Lorain Stephens*).

Scientific Groups Visit Museum

Two large groups of scientists attending conventions in Chicago were visitors at the Museum last month. Several hundred professional anthropologists were guests of the Museum's anthropological staff between meetings of the American Anthropological Association. Members of the Department of Zoology were hosts to Veterans Administration Consultants on Tropical Diseases.

MUSEUM AID TO CHRISTMAS SHOPPERS—

Christmas shopping and wrapping packages can be made easier if you use services Chicago Natural History Museum offers:

(1) Christmas Gift Memberships

Send to the Director the name and address of the person to whom you wish to give a Museum membership, together with your remittance to cover membership fee (see enclosed Christmas gift membership order form).

An attractive Christmas card will notify the recipient that through your generosity he has been elected a Member of the Museum. He will receive also his membership card and information on membership privileges.

(2) Museum Book Shop Gifts

Books endorsed for scientific authenticity by members of the Museum staff are on sale in the BOOK SHOP. The selection is for both adults and children.

When desired, the BOOK SHOP will handle orders by mail and telephone (WAbash 2-9410). It will undertake all details of wrapping and dispatching gift purchases to the designated recipients, together with such personal greetings as the purchaser may specify, charging only postal costs.

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